

The AUTOMOBILE

Thomas, in Delage, Wins

First Four Places in 500-Mile Sweepstakes Taken by Delage and Peugeot—Oldfield in Stutz Fifth

By J. Edward Schipper



The winner and his mechanician

INDIANAPOLIS SPEEDWAY, IND., May 30.—Special to THE AUTOMOBILE.—Once more the tricolor of France waves triumphant over the victors of the Indianapolis 500-mile automobile race. René Thomas, driving his Delage, a new car to compete in this country, around the 2.5-mile saucer with the regularity of clockwork, finished first in the record time of 6 hours 3 minutes and 45 seconds, or an average speed of 82.47 miles an hour.

Duray Is Second

Seven minutes behind the victor, driving for France, and a matter of \$10,000 in prize money, came Arthur Duray in a privately entered Peugeot. Flashing across the tape in the time of 6 hours 10 minutes and 24 seconds, he captured second place at an average of 80.99 miles an hour. Albert Guyot in another Delage crossed the tape 4 minutes later, taking third place. Fourth place was captured by Jules Goux in another Peugeot. Goux was the winner last year.



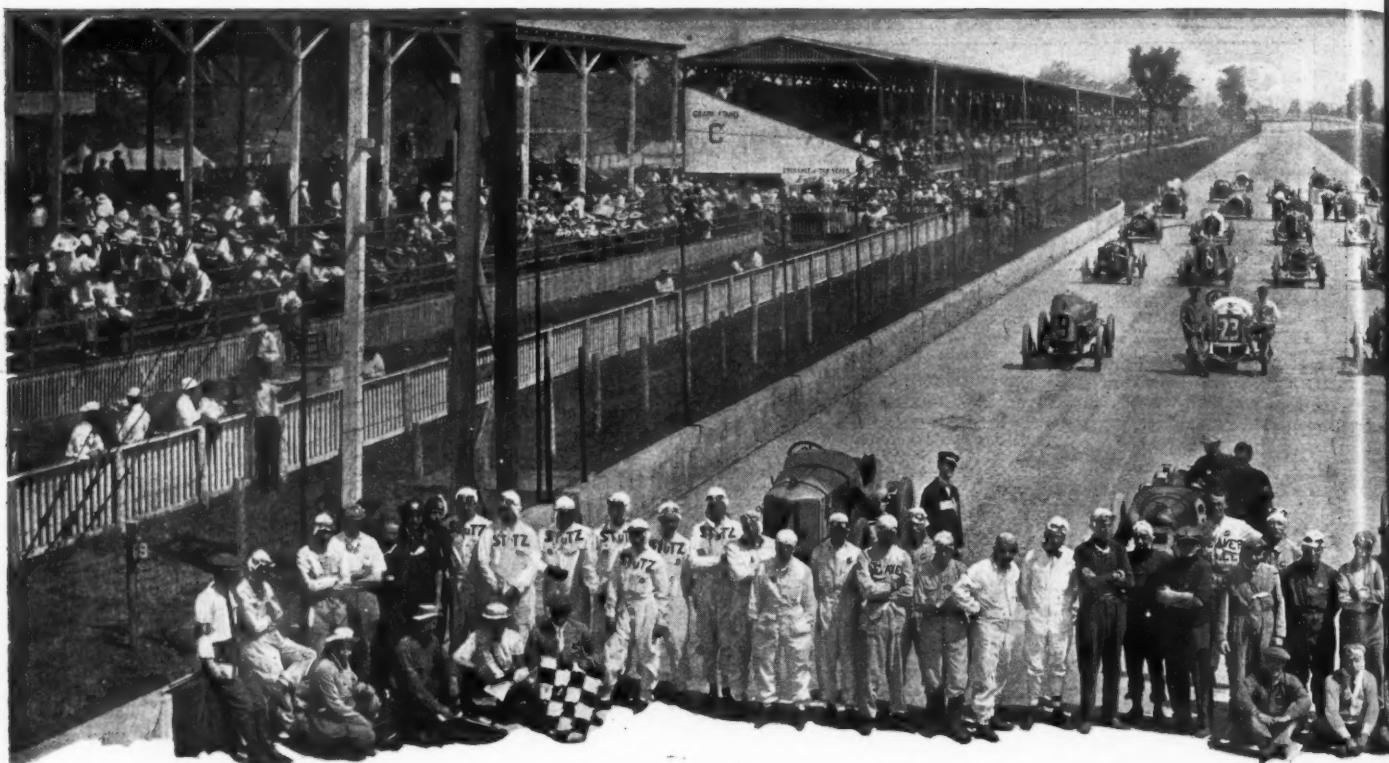
Thomas at the finish

The first American to finish was Barney Oldfield. The veteran piloted his Stutz at an average of 78.15 miles an hour, and at this speed captured fifth place. The others to finish were the Excelsior, driven by Christiaens, sixth; Sunbeam, Grant, seventh; Beaver Bullet, Keene, eighth; Maxwell, Carlson, ninth; Duesenberg, Rickenbacher, tenth; Mercedes, Mulford, eleventh; Duesenberg, Haupt, twelfth; Keeton, Knipper, thirteenth.

It was by far the fastest of the four 500-mile races so far held on the Speedway. The first four men to cross the finish line, all Frenchmen, too, by the way, exceeded the record time of 78.72 miles an hour made by Dawson in 1912. At the time of the elimination trials the speed shown by the foreign contestants caused it to be freely predicted that 80 miles an

DIVIDERS OF THE SPOILS

CAR	DRIVER	M.P.H.	PRIZE
Delage.....	Thomas	82.47	\$39,750
Peugeot.....	Duray	80.99	10,250
Delage.....	Guyot	80.27	5,425
Peugeot.....	Goux	79.49	3,500
Stutz.....	Oldfield	78.14	3,000
Excelsior.....	Christiaens ...	77.42	2,200
Sunbeam.....	Grant	75.68	1,800
Beaver Bullet.	Keene	74.81	1,600
Maxwell.....	Carlson	70.97	1,500
Duesenberg....	Rickenbacher..	70.28	1,400.



Line-up of drivers, mechanicians, etc., of cars in fourth annual 500-mile race at Indianapolis Motor Speedway, in which

hour would be exceeded by the winner. The first three men across the line did better than that speed.

Thomas in the Delage not only won the prize for first place but also picked up the prizes which were provided for the leader at each 100 miles, netting \$37,000, including accessory money.

Foreign Drivers Win \$61,125

Last year the French team carried away \$26,500, Goux having won \$20,000 with his Peugeot; Guyot, Sunbeam, \$3,500 for fourth place, and Pillette, Mercedes-Knight, \$3,000 for fifth. In addition last year Mulford's Mercedes was another foreign make to win cash making four in the money as against six this year. All six of the foreigners who finished won prizes. Of the seven Americans to finish only four were in the money. Foreign drivers this year won \$61,125.

America built high hopes on Joe Dawson, winner of the 1912 Speedway meet and today at the wheel of a Marmon. Sad fate removed him from the duel just after he had covered 100 miles. At that time Dawson was driving in seventh place, only 39 seconds back of Duray, who was leading, and but 4 seconds behind Thomas the eventual winner. Dawson was following Gilhooley in the Isotta when the latter blew a right rear shoe while near the outside of the track. The Isotta struck the cement wall at the outside and then started across the track to the inside, turning turtle twice and landing on the driver and mechanic in the middle of the brick track on which twenty-six other cars were running at that time. There was a narrow space between the wrecked Isotta and the cement wall at the outer edge of the track. Wilcox, driving the Gray Fox, was close behind the Isotta and drove through this space. Back of him came Dawson, but just as Dawson approached, the Isotta mechanician began to crawl from under the wreck and towards the outside wall. Dawson realized that to follow the Gray Fox would be to strike the wounded mechanician. Instead he veered to the inside of the Isotta, but his Marmon skidded, turned turtle twice and landed on the soft ground inside the track. Dawson was severely injured internally and was removed to the hospital with even chances for recovery. Gilhooley and the two

mechanics were badly lacerated but not severely injured.

Many mishaps to the cars occurred during the first 100 miles, when the fight was fiercest. Cooper's Stutz was in third place when his car went out and within hailing distance of the leader. His relief driver was at the wheel when a tire blew out and he ran off the track, breaking two wheels. This was in the 120th lap. When Boillot went out in the 142nd lap he had just taken the lead, which he had regained but a short time before. The cause of his undoing was a tire which blew out when going into the second turn. The tire hit him in the arm and bruised it and also tore off his necktie. As a result of the wrench the car frame was broken and destroyed his chances of finishing.

The Smallest Car's Big Showing

Significant as is the victory of the French cars, the most striking feature of the race was the fact that the Duray Peugeot car finished second. This car, although somewhat erroneously called the Baby Peugeot as it had nothing in common with the small car of that name, which was by far the smallest car of the race, with a piston displacement of but 183 cubic inches, ran a race that put to shame the big specially-constructed racing machines that were designed to come just under the displacement requirement of 450 cubic inches. It was little less than a complete triumph for the small high-speed motor.

All Credit to Oldfield

Today has been a bad day for America. Our hopes have been crushed to earth one after another, and when 300 miles of the distance were covered those on whom we had staked most were gone; but thanks to the American veteran track driver, the hero-worshipped Barney Oldfield, we got fifth honors, Oldfield's Stutz being the only American car to land in the first seven places. Oldfield drove consistently from start to finish, averaging 79.14 miles per hour, and was loudly applauded when he drew up at his pit, being the first American driver and the first American car to finish the 1914 American classic.

When the thirty contenders for the Speedway's \$50,000 cash



distance records of the course were broken. Copyrighted by H. H. Coburn, Official Photographer for Indianapolis Motor Speedway

lined up today we all knew our sons were to meet foreign foemen worthy of their steel piloting cars than which none can be better built. But we hoped and we trusted. We looked to Mercers, to Stutzs, to the new Maxwells, to Dawson, the 1912 winner in his Marmon, and to others.

But the fates were against us. One by one our idols were shattered; one by one our chances faded, and when the end came and the triumph of the tricolor was complete all our hopes clung to the veteran, Oldfield, and we were glad that he was able to beat off the two other drivers and two other foreign cars who finished, Christiaens, who got sixth place in the Belgian Excelsior, and our native son Harry Grant, who carried off seventh honors with an English Sunbeam.

America Gets Last Three Places

To America came the last three places in the money, positions eight, nine and ten. Keene, a newcomer, in a car of his own make, named the Beaver Bullet, was eighth; Carlson, in one of the new Maxwells built by Ray Harroun, was ninth, and Rickenbacher, well-known to American enthusiasts, took tenth place in a Duesenberg car. His average was 70.82 miles per hour.

American hopes voiced by the 110,000 present fell by the wayside when the two Mercers piloted by such Speedway veterans as Wishart and Bragg were eliminated. Both were dangerous contenders until engine troubles developed in the 300-mile zone. Wishart was running fourth at 100 miles but 29 seconds back of the leader. At 200 miles he was in third place and only 38 seconds behind Duray, then leading in the little Peugeot. At 300 miles he was within 3 seconds of Thomas in the Delage, who was then in the lead, having passed Duray. But, when hopes were highest, misfortune came soonest; his camshaft broke and he was out.

Scarcely better fortune awaited his teammate, Caleb Bragg, who, running neck and neck with him for many laps, was in fifth place at 100, sixth at 200 and well up on approaching the 300, when eliminated by a broken magneto drive shaft.

So went three American favorites, and as each was eliminated Europe's share in the \$50,000 increased. America had hoped that the two Maxwell cars which were uncertain

factors, due to being completed only a few weeks before the race and not properly worked in, would weather the gale, and after Tetzlaff had qualified next to Boillot and Goux in the preliminaries many looked for him to be a strong defender of American prestige. But, alas, trouble came early. A valve rocker arm broke and Tetzlaff was out before a century had been covered.

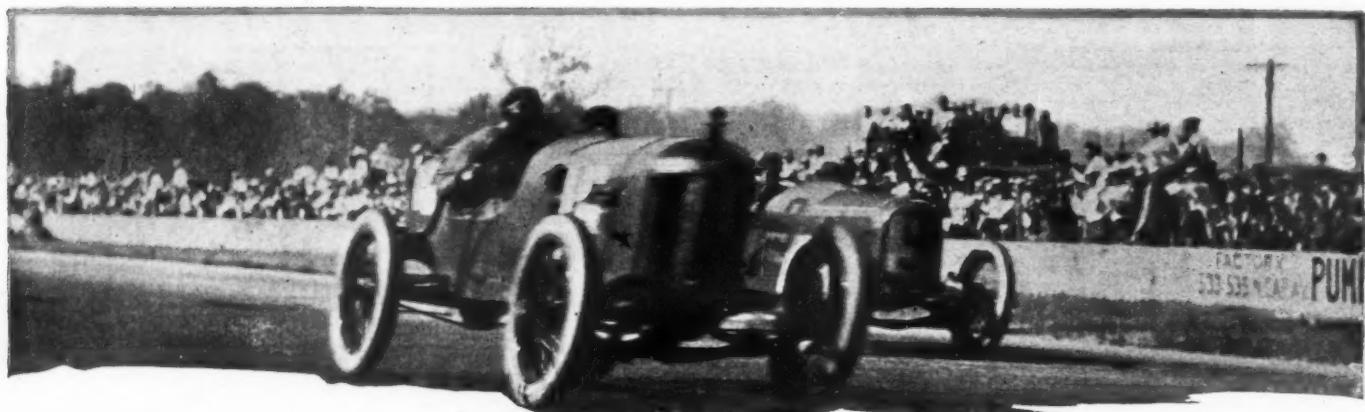
A Reconciliation of Rivals

It was an open secret before the race that the rivalry between the Peugeot and Delage teams was intense, but a second chapter is added to this story in telling of the contempt of Goux and Boillot for the Duray Peugeot entry. This was because he was driving, not for the Peugeot factory, but for a private sportsman of France. Besides it was thought that his car was so diminutive that he would have no chance and would bring humiliation on the Peugeot name. At the finish of the race none were quicker to hail Duray than Goux and Boillot as the saver of the Peugeot name and to congratulate him on the glorious showing he had made.

Great disappointment was expressed on all sides when DePalma withdrew because of the excessive vibration of his car, which showed itself in the preliminary trial. This withdrawal on his part made it possible for the Isotta to start and also made it possible for the accident which afterward occurred to happen. Before the DePalma Mercedes was excused Pullen was given a chance to drive the car, but declined, offering the reason that the car was not in proper condition. The car was then officially excused by the referee.

Thirteen Starters Finished

Of the thirty starters, seventeen fell by the wayside and thirteen finished the five centuries on the brick track. An analysis of those unfortunates shows that they were eliminated at two periods during the race, the first period of elimination being between miles 100 and 180 and the second period being between 300 and 380 miles. In the first period seven cars were eliminated and in the second one six were dropped out, leaving but four others that were removed from the race very close to these two periods. This situation shows



Thomas, in the Delage, the winner of the race, passing Christiaens in the Excelsior

that by dividing the race into five divisions or centuries of 100 miles each the odd numbers, centuries one, three and five were the fortunate ones, and the even numbers, two and four those in which most cars were eliminated.

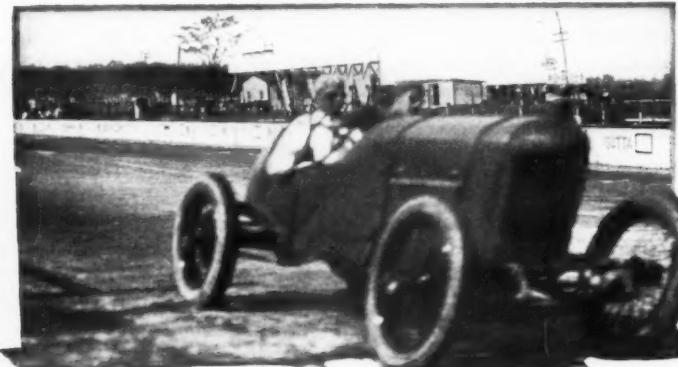
When 120 miles of the distance were covered seven cars were out; when 220 miles were covered ten were out; there were thirteen out at 300 and all seventeen at 380 miles.

Motor Parts Were Weak

Further analyzing the tale of elimination in the race it is found that nine of the seventeen, or over 50 per cent., were eliminated due to engine trouble, valves, camshafts, connecting-rods, crankshafts and other parts giving way. Bragg broke a magneto shaft driver; Wishart broke a camshaft; Tetzlaff had a broken valve rocker arm; Anderson broke a crankshaft; Burman broke a valve; the Ray had a broken cam; the King went out with a broken valve, and the Braender Bulldog with a broken connecting-rod. This tale of broken motor parts shows the necessity of increasing the strength of all motor parts when the output of power is increased.



Duray, in the little Peugeot, leading Grant in the Sunbeam



Guyot, in the Delage, which finished third at high speed

The Story of the Race—A Fierce Battle from the Start

JUST before 10 a. m. the cars were lined up before the starting line in rows across the track. At the word from the starter the cars were led around the course by a pacing car at a speed of 60 miles an hour for one lap and then the race was on. With a roar like a battery of Gatling guns the thirty cars streamed past the starting line, and before the end of the first lap they were strung out over the course.

The Gray Fox with Wilcox at the wheel was the first to cross the line at the end of the first lap, closely followed by Christiaens in the Excelsior and Carlson in his Maxwell. The winning Delage was at that time in tenth place. Before the end of the second lap the Gray Fox had been passed by the Excelsior in the first brush of the race and also by Carlson and Tetzlaff in the two Maxwells. At the end of this lap Thomas had crawled up to ninth place. The steady drumming roar of the French cars could already be distinguished by the spectators from the bark of the American cars, and the rhythmic purr of the Delage and Peugeot exhausts seemed to speak volumes for the mechanical efficiency and stamina that was to make the cars stand up to their long grind.

Excelsior Takes the Lead

Coming around on the third lap the Excelsior had crawled away from the rest of the cars and a space of 300 yards separated it from Goux, who had forced his Peugeot to the front and was rapidly gaining. Following Goux came Bragg in his Mercer, the two Maxwells, Wilcox in the Gray Fox, Thomas in the Delage, which had now crawled into eighth position, showing remarkable speed on the turns and passing one by one the cars in front. The rivalry at this early part of the race was intense. It became apparent that every driver was pushing his car to the utmost to attain, if possible, an early lead before the track should become slippery enough to cut down his speed.

The cars were scattered by this time all over the course and the faster ones were picking their way through a broken field to the front. Conspicuous among these were Thomas and Goux, who seemed to be determined to secure an early hold on a front position. At the end of the fourth lap the lead was still held by Christiaens in the Excelsior, but Goux had cut his lead of 300 yards down to half that distance.

Goux Comes to the Front

A cheer went up from the stands as on the fifth lap it was seen that Goux had passed the Excelsior. The brush had been an exciting one with the two cars taking the turns at almost the same speed that they exhibited on the straightaways. It was evident that the hot pace was going to put

many out before the first 100 miles had been completed, and this afterwards proved to be the case. With but a 100-yard interval between him and the Excelsior came Bragg in his Mercer, and then in fourth place the Delage which in this lap had passed two other cars and had taken fourth place. Gil Anderson in his Stutz and Boillot in his Peugeot were close on the heels of Guyot in the Delage and the three passed the stands with not a length between them. Every one of these cars was averaging close to 90 miles an hour.

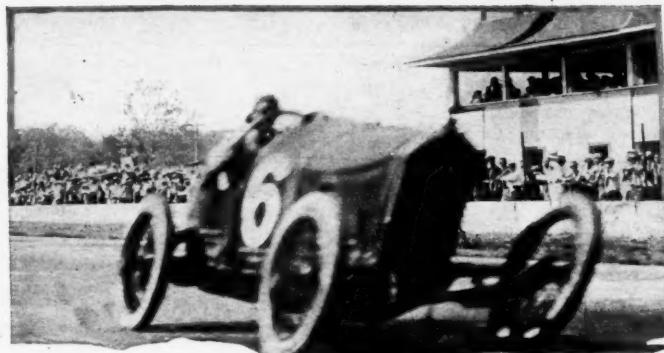
At the end of the sixth lap when the cars had traveled 15 miles it was seen that the Excelsior was back in the lead, closely followed by Bragg in the Mercer and with Thomas third. Goux, who had held the lead on the previous lap, came limping into the pits with a flat right front shoe. The race was then hot between Christiaens, Bragg and Thomas. The three fought it out radiator to radiator and on the seventh lap Bragg had forced his way to the front with Christiaens second and Thomas third. At 100 yards behind came Boillot, Guyot and Anderson. Quite a gap separated these cars from the next following, and between them a bitter fight to secure an early hold on first place ensued.

The Bugatti Jumps to Second

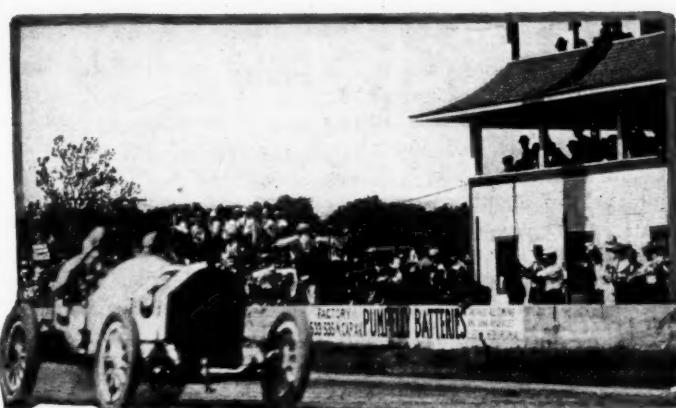
On lap eight Christiaens again succeeded in passing Bragg, and Thomas and Boillot were closely drawing up to the leaders. These four cars had now lapped the entire field, and were setting so lively a pace that it became evident that if it could be held all previous records would be surpassed. On the ninth lap a burst of speed on the part of the Bugatti driven by Friedrich put this car into second place, with Christiaens still holding the lead. In third place was Boillot and fourth Thomas, who seemed to realize that now that the ninth lap had been passed he was well on his way toward the first 100 miles and that it was necessary for him to stay with the leaders if he were to capture the first of the chain of prizes distributed along the route. This was the G and J trophy of \$1,500, and even if it was won by a car that did not finish it was well worth striving for. For this reason all the cars fought to secure an early berth in first place, in order to pass the 100-mile mark and gain the prize.

Christiaens Holds the Pace

On the tenth lap Christiaens held his lead, although he was pushed hard by Boillot and Thomas, all three cars being very close together and racing for the lead. On the eleventh lap Thomas and Boillot were still up in front and had completely lapped Oldfield in the Stutz and Tetzlaff in his Maxwell. All these cars passed the stand together with the first two mentioned giving evidence of superior speed on the straightaways. Christiaens held the lead until the thirteenth lap, now being hard pushed by Boillot and then by Thomas, until on the twelfth lap Boillot had a tire accident on his right front wheel and was compelled to stop at



Goux, in the Peugeot, with which he finished fourth



Oldfield, in the Stutz, only American in the first five

the pits, losing his position in second place. A struggle for first place now lay between Christiaens and Thomas, and their two cars made a thrilling race of it. Thomas forged to the front in the thirteenth lap and held his place from that time until he had picked up the 100-mile prize. Although he held the place he did not hold it without a struggle, being closely pursued throughout by Christiaens and Bragg. At the end of the fifteenth lap an interval of but 8 seconds separated Christiaens from the flying Delage driven by the wily Thomas, who was afflicted all through the long afternoon with a chronic itching palm. At the end of the sixteenth lap the Delage had gained 5 seconds more on Christiaens, and now was 14 seconds behind the leader. Bragg in the Mercer was 20 seconds behind and Burman in the car bearing his name was 22 seconds behind; 1 second back of Burman was Goux in his Peugeot, who had dropped out in the eleventh lap but who now was rapidly regaining his speed and had put himself into fifth position. Mulford in the Mercedes was not far behind Goux and Guyot was again well up in front, following just behind Mulford.



Left to right—Wilcox, in the Gray Fox; Tetzlaff, in the Maxwell, and Chassagne, in the Sunbeam, Just before the race

and collected the prize money for this point. Twenty-two seconds behind Thomas came Duray in his Peugeot who had taken second place but shortly before, and 87 seconds behind the leader, was Guyot in a Delage. Christiaens and the Excelsior came 10 seconds behind Guyot, followed within less than a second by Wishart in one Mercer and his team mate Bragg in another. Three laps behind were Goux and Boillot in the two Peugeots which had been picked so freely to make a runaway race of it. They forced their cars whenever there was an opportunity but could not get the lead.

Dawson Overturns on 44th

It was in the forty-fourth lap that Dawson in his Marmon collided with Gilhooley in the Isotta and put both these cars out of the race. In the forty-first lap Gil Anderson withdrew his Stutz. In this lap Thomas lapped the Excelsior and both Mercers. A wild cheer greeted him as he tore by the stands as the spectators seemed already to sense him as a possible winner. At the end of the forty-seventh lap another elimination took place when Burman withdrew the car which bears his name, and shortly afterwards the Maxwell driven by Tetzlaff caught fire and before the blaze could be extinguished the car was so badly damaged it had to drop from the race. The gruelling pace was beginning to tell heavily on the cars that had not been sufficiently tested out for a race of this nature, and one by one the list was narrowing itself down towards the thirteen who finally finished.



Thomas, the winner, in his powerful Delage

Great agitation occurred in the Peugeot pit when the little privately entered Peugeot climbed into first place at the end of 155 miles, or 62 laps. It held this lead for 5 laps and then was forced to stop for its first tire change. Guyot's Delage took the lead and passed the 175-mile mark at 2:03:59.05.

Mercers Leading on 51st

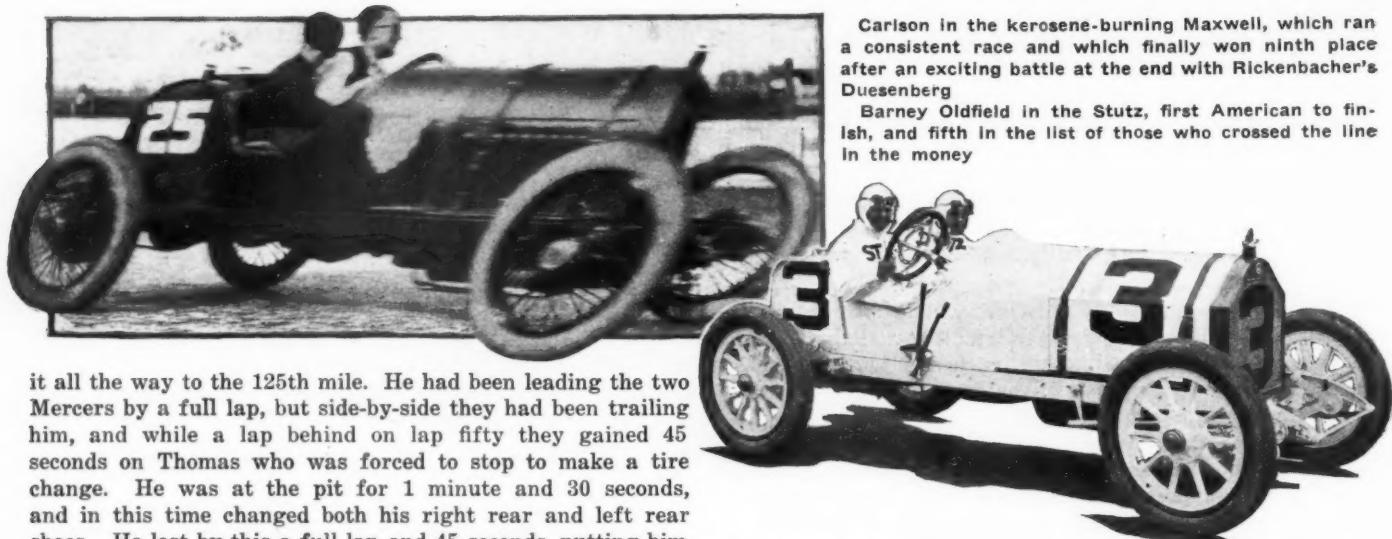
At the end of lap fifty-one the two Mercers with Wishart and Bragg driving took the lead over Thomas, who had held

TIME REQUIRED FOR THE ENTIRE RACE AT 20-MILE INTERVALS FROM START TO FINISH

	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	Average Speed in Miles per Hr.						
88	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500							
2:25:43	2:41:35	2:55:42	3:10:13	3:25:00	3:38:29	3:53:51	4:07:51	4:22:33	4:37:45	4:52:02	5:06:19	5:20:26	5:34:51	5:49:10	6:03:45	82.47						
2:25:51	2:39:49	2:53:50	3:08:58	3:24:45	3:38:54	3:55:01	4:09:49	4:23:55	4:40:10	4:57:56	5:12:30	5:26:48	5:41:03	5:55:44	6:10:24	80.99						
2:30:58	2:45:17	2:59:44	3:14:12	3:28:51	3:43:37	3:58:20	4:13:03	4:27:46	4:40:18	4:55:09	5:08:04	5:28:43	5:43:40	5:58:56	6:14:01	80.20						
2:26:02	2:42:25	2:56:21	3:18:22	3:34:27	3:50:29	4:04:45	4:19:23	4:32:03	4:45:45	4:59:59	5:17:45	5:31:59	5:46:00	6:01:52	6:17:24	79.49						
2:29:51	2:44:53	2:59:52	3:16:47	3:33:56	3:49:11	4:04:38	4:20:17	4:33:13	4:48:27	5:05:38	5:21:07	5:36:25	5:51:38	6:06:49	6:23:51	78.15						
2:29:00	2:43:55	2:59:30	3:19:47	3:34:40	3:49:47	4:06:42	4:22:24	4:36:25	4:54:12	5:11:20	5:27:09	5:42:40	5:58:19	6:11:50	6:27:24	77.44						
2:40:42	2:55:34	3:13:33	3:28:46	3:43:53	3:59:04	4:14:08	4:29:38	4:44:34	5:03:07	5:18:17	5:33:48	5:48:51	6:05:53	6:21:09	6:36:22	75.68						
2:40:23	2:56:59	3:11:55	3:29:15	3:43:58	3:59:01	4:18:59	4:33:31	4:47:55	5:12:09	5:28:51	5:46:21	6:00:55	6:15:25	6:24:39	6:40:57	74.82						
2:55:04	3:11:03	3:28:30	3:45:46	4:03:47	4:19:42	4:41:54	4:57:25	5:12:24	5:27:34	5:44:13	5:59:24	6:14:14	6:29:07	6:46:34	7:02:42	70.96						
2:35:13	2:49:55	3:07:55	3:25:12	3:43:45	4:12:12	4:30:35	4:47:12	5:01:04	5:21:30	5:34:15	5:48:55	6:03:44	6:18:25	6:33:09	7:03:34	70.83						
2:52:14	3:07:28	3:22:51	3:37:18	3:52:29	4:08:28	4:32:33	4:45:40	5:01:00	5:16:22	5:52:15	6:07:44	6:23:28	6:39:37	6:55:26	7:11:20	69.55						
3:05:53	3:24:42	3:41:30	4:01:48	4:18:48	4:31:35	4:53:17	5:11:46	5:26:07	5:40:37	6:03:29	6:24:40	6:39:50	6:59:54	7:14:51	7:29:58	66.66						
2:46:35	3:02:22	3:17:50	3:35:14	3:50:38	4:12:58	4:29:28	4:40:48	4:56:06	5:19:30	5:35:05	5:50:35	6:20:34	7:07:50	7:22:42	7:36:42	65.79						
2:30:10	2:42:04	2:56:05	3:10:10	3:24:28	3:39:19	3:54:15	4:07:48	4:24:11	Out one hundred forty-first lap, broken frame													
2:53:10	3:08:54	3:33:28	3:48:44	4:05:28	4:20:46	4:34:08	4:49:30	Out one hundred thirty-fourth lap, broken ball bearing in drive pinion														
2:46:21	3:03:54	3:20:02	3:51:57	4:07:40	4:24:12	5:09:35	Out one hundred seventy-first lap, broken connecting-rod															
2:25:49	2:41:37	2:55:49	3:09:51	3:24:04	3:38:32	Out one hundred twenty-second lap, broken connecting-rod																
2:29:59	2:42:39	2:58:51	3:13:31	3:27:59	Out one hundred thirty-second lap, broken camshaft																	
2:29:19	2:45:02	2:59:23	3:13:56	3:30:26	Out one hundred thirty-third lap, broken rocker arm																	
2:39:45	Out in eighty-first lap with broken valve																					
	Out sixty-ninth lap, broken connecting-rod																					
	Out sixty-fifth lap, valve through piston and crank case																					
	Out sixty-seventh lap, broken piston																					
	Out forty-fifth lap, turned over																					
	Out forty-seventh lap, broken connecting-rod																					
	Out forty-second lap, loosened cylinder bolts																					
	Out forty-second lap, overturned																					
	Out thirty-third lap, broken rocker arm																					

The Table

The above table tells the story of the race from the beginning to the end. Thirteen out of the thirty starters finished the race and as will be seen more than 1 hour separated the winner from the last to finish and almost exactly 1 hour separated the winner, Thomas in the Delage, from the last man in the money, Rickenbacher in the Duesenberg. In this table is also shown when the cars were forced to abandon the race and for what reasons. The story of the elimination of our American hopes is graphically shown. How they dropped out, starting with the Ray in the fifth lap and ending finally with but six Americans to finish and with but four in the money can be seen at a glance.



it all the way to the 125th mile. He had been leading the two Mercers by a full lap, but side-by-side they had been trailing him, and while a lap behind on lap fifty they gained 45 seconds on Thomas who was forced to stop to make a tire change. He was at the pit for 1 minute and 30 seconds, and in this time changed both his right rear and left rear shoes. He lost by this a full lap and 45 seconds, putting him in third place. On the fifty-seventh lap Wishart had to stop for a tire and at the same time to take on gas. This left his team mate Bragg in the lead for a short time, but he was soon overhauled by Guyot in his Delage, who took the lead on the sixty-seventh lap. At the end of 150 miles the latter was leading, with Bragg 61 seconds behind. At the end of the eightieth lap or 200 miles Thomas was again in the lead, having made up the time he lost on his tire change and having crossed the tape for the 200th time in 2:23:57.01. This smashed the old record held by Tetzlaff for the distance, which was 2:25:59.52. Close behind Thomas in his Delage was the little Peugeot driven by Duray. Wishart's Mercer was third and Boillot's Peugeot was fourth. The Excelsior, which had always remained well up in front, was fifth, and Bragg's Mercer was sixth. The average speed attained by Thomas at 200 miles was 83.36, and at this time the Ray, Sunbeam, Stutz, Marmon, Isotta, Maxwell, Braenderup, Grey Fox, Burman and Mason were out of the race.

Thomas Ahead at 200 Miles

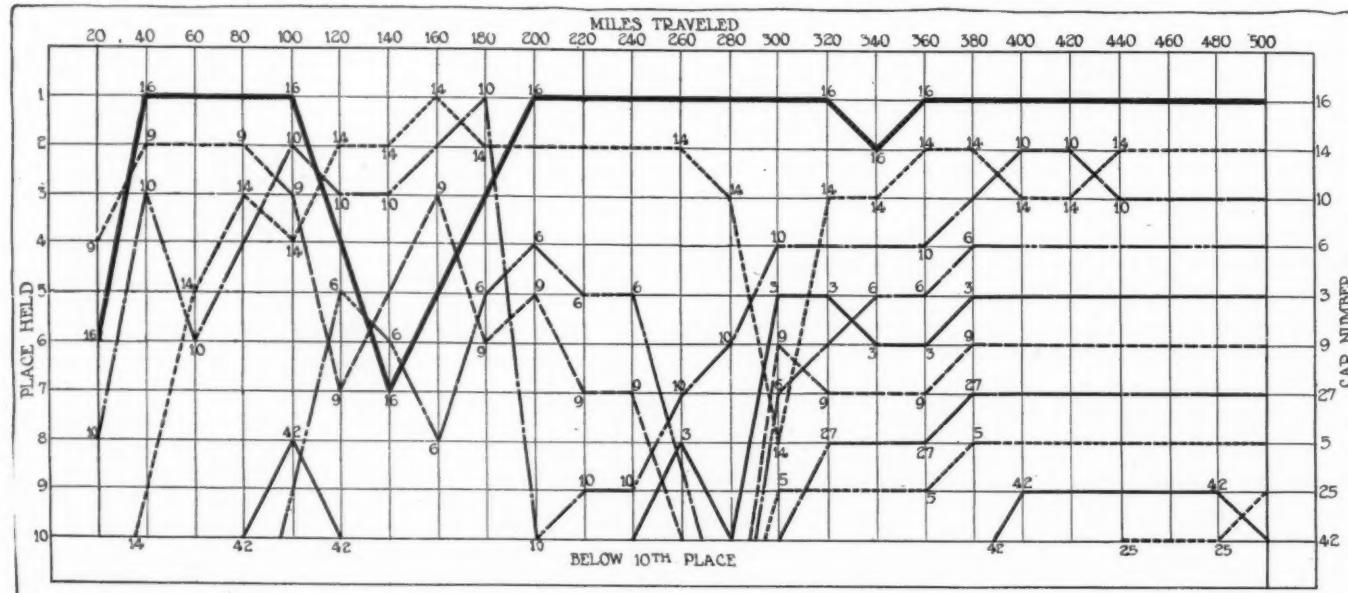
Having again captured a prize when he passed the 200-mile mark Thomas settled down to a steady grind toward the 300-mile mark. He was not passed between 200 and 250 miles by any of the cars, although during this part of the race he was pressed very hard by Boillot in his Peugeot.

These two cars were a full lap ahead of the next contender, Wishart in the Mercer. Following Wishart were Duray, Bragg and Guyot in close succession. Thomas' time for the 250 miles was 3 hours and 58 seconds, an average of 82.85 miles an hour. At this point of the race Anderson, who had withdrawn his car earlier in the race, relieved Oldfield at the wheel of his Stutz.

America Falling Behind

As the time for another reward began to approach Thomas, following his usual custom, forged out in front, and at the end of 300 miles a clear stretch separated him from Boillot, his avowed rival. Thomas' time for the 300 miles broke Dawson's record by 11 minutes. Thomas' time for the distance was 3:37:31.89. At this time Wishart was running third and Duray in a little Peugeot fourth. Cooper's Stutz was fifth, Guyot's Delage sixth, Bragg's Mercer seventh, the Christiaens' Excelsior eighth, Oldfield's Stutz ninth and Goux's Peugeot tenth.

It began to be evident at this period of the race that the chances of the American entries were small. The only ones at this time to whom all the American eyes were turned were Wishart's Mercer and Cooper's Stutz, but these soon slipped away when Bragg's Mercer sustained a broken crank-shaft and went out in the 117th lap. This was followed shortly



Graphic story of the struggle to be in the money, the cars corresponding to the numbers being shown at the head of page 1159, giving the table of positions

POSITION OF CARS EVERY EIGHT LAPS, OR 20 MILES, INDICATED BY CAR NUMBERS

No.	Car	Driver	Miles:	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	
16	Delage	Thomas		3	9	16	14	16	21	21	14	10	14	14	14	14	19	16	16	7	16	16	16	16	16	16	16		
14	Peugeot	Duray		43	21	9	9	14	14	14	10	14	16	16	16	19	7	19	7	16	14	14	10	10	14	14	14		
10	Delage	Guyot		5	10	21	21	10	10	10	9	16	79	19	19	7	14	7	14	14	.7	10	14	14	10	10	10		
6	Peugeot	Goux		9	43	26	10	9	16	19	21	19	6	7	7	16	16	10	10	10	6	6	6	6	6	6	6		
3	Stutz	Oldfield		21	26	14	19	19	6	9	16	6	9	6	6	2	2	3	3	6	6	3	3	3	3	3	3		
9	Excelsior	Christiaens		16	16	10	26	21	19	6	19	9	21	2	2	21	10	9	6	3	3	9	9	9	9	9	9		
27	Sunbeam	Grant		1	24	19	16	26	9	16	6	3	3	9	9	10	21	6	9	9	9	27	27	27	27	27	27		
5	Beaver Bullet	Keene		10	19	24	24	42	4	4	3	21	2	3	21	3	3	14	27	27	27	5	5	5	5	5	5		
25	Maxwell	Carlson		24	14	1	1	6	1	1	1	2	7	21	10	6	6	5	5	5	5	23	42	42	42	42	42		
42	Duesenberg	Rickenbacher		19	4	43	42	1	42	42	7	7	10	10	3	9	9	27	31	31	31	31	31	31	25	25	42		
23	Mercedes	Mulford		26	1	31	3	4	3	3	2	42	42	42	42	42	42	23	42	23	23	42	25	25	31	23	23		
43	Duesenberg	Haupt		14	7	3	31	3	7	7	42	15	15	27	5	27	27	42	23	42	42	25	23	23	43	43	43		
31	Keeton	Knipper		4	12	29	4	7	2	2	23	27	5	5	27	5	5	31	34	34	25	43	43	43	31	31	31		
7	Peugeot	Boillot		2	6	4	6	23	23	23	27	5	27	31	31	31	25	25	25	43									
34	Bugatti	Friedrich		23	27	23	7	2	27	27	15	1	1	1	1	23	23	34	43	43									
1	Burman	Disbrow		15	31	42	49	24	31	31	5	31	31	23	23	25	25	1	1										
19	Mercer	Wishart		12	49	5	23	31	15	15	31	25	23	34	25	34	34	34	43										
2	Stutz	Cooper		17	15	6	2	5	13	13	38	23	34	25	34	1	1												
21	Mercer	Bragg		42	3	7	5	17	5	5	4	34	25	43	43	43	43												
15	King	Klein		31	38	2	38	49	38	38	13	43	43																
38	Braender	Chandler		27	5	27	15	27	43	43	25																		
4	Gray Fox	Wilcox		49	2	38	17	15	25	25	34																		
13	Mason	Mason		25	42	15	27	38	34	34	43																		
26	Marmon	Dawson		38	25	17	34	13																					
24	Stutz	Anderson		6	34	34	13	34																					
17	Burman	Burman		13	17	25	25	25																					
49	Isotta	Brock		8	13	13	43	43																					
8	Maxwell	Tetzlaff		34	8	8	8																						
12	Sunbeam	Chassagne																											

after by the next American hope, Wishart's Mercer, which dropped out in the 123rd lap. Cooper's Stutz also joined the other Americans hors du combat, having lasted but 118 laps. The American representatives left upon whom were based the hopes of the patriotic spectator were Oldfield's Stutz, the Beaver Bullet, the Keeton and Carlson's Maxwell. The Maxwell car was running on kerosene as a fuel, and had kept up a steady pace throughout the entire race. Considerable excitement was manifested when Boillot passed Thomas on the 135th lap. At this time first place was held by Grant's Sunbeam, an American driver with an English car, which had buzzed its way steadily around the track without exciting much comment until this time. Close behind Grant came Ralph Mulford in his Mercedes.

Blowout Allows Thomas to Pass Boillot

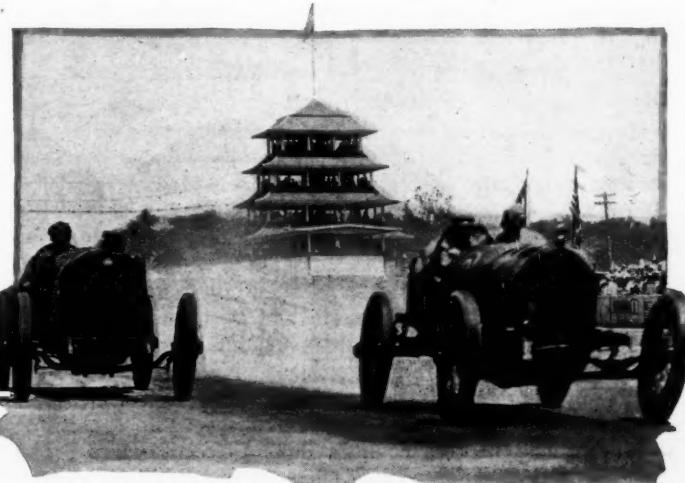
On the 147th lap Boillot blew out a tire while on the back stretch. The casing became entangled in the wheel and before Boillot could reach the pits Thomas had gained a three-lap lead. A 32-second change put Boillot again in the race and his pursuit of his great rival began. It did not last long, however, for after having past the 368th mile a wrench given his car by the blowing of a tire fractured his frame and he was declared out of the race. This placed Thomas in the lead with only Duray as another possibility. At 400 miles Thomas was still ahead, incidentally gathering in a little more money, and although Duray pressed him hard he held that lead.

With 75 more miles to go Thomas had a lead of 7 miles over Duray. Two miles back of the latter came Guyot, and he in turn led Goux by 10 miles. This made Goux's chance a practically hopeless one in view of the short distance still

to go. The Maxwell, upon which considerable interest was centered on account of the kerosene carburetor, had moved up into seventh place, with the first six in the same order they had passed the 400-mile mark.

Duray 3 Laps Behind

With only 50 miles to go Thomas led Duray by 3 laps. Guyot was a lap behind Duray, and back of him 3 laps was Goux. The average speed for the 450 miles was 82.42 miles an hour. This was 17 minutes ahead of the track record formerly held by Dawson in a National in 1912. There was



One of the brushes between Wishart, in the Mercer, and Thomas, in the Delage



Many viewed the race from their cars in the infield parking space. This space provided a clear view of the track and permitted the occupants to walk around the course during the progress of the race. The cars reached the interior parking space by means of a subway which passes beneath the track.

now only 10 laps to go. The cars were running in the same relative positions, and there did not seem to be much chance that any would change. The remaining 25 miles was all that separated Thomas from victory and he ran a steady course. At this time Barney Oldfield was the only American among the first cars, while in the eighth, ninth and tenth places respectively were the Beaver Bullet, Keeton and Rickenbacher's Duesenberg, the latter an American car in spite of the foreign sounding name.

Race Won in 6 Hours

Just 6 hours 3 minutes and 45 seconds after he started Thomas in the Delage crossed the tape for the last time and the \$20,000 was his. At the time that he finished Duray in his little Peugeot had traveled 194 laps, Guyot in his Delage 192, Goux 191, Oldfield 188, Christiaens 186, Grant 182, Keene in the Beaver Bullet 174, Rickenbacher 172 and Carlson in the kerosene-burning Maxwell 169. These cars all finished in the order named except for the change in position which brought Carlson in ahead of Rickenbacher. At this time Willie Haupt was driving the Duesenberg as a relief for Rickenbacher, and one of the most exciting events of the day occurred. The race between Haupt and Carlson for ninth place had been intense, but it seemed that the latter who led by 3 laps, having to go but 28 when Haupt had still 31 to go, had surely won the position and with it the \$1,500 in prize money. On the 199th lap the Duesenberg blew out a tire and had to draw up to the pits after receiving the green flag signal that it had but one more lap to go. A quick tire change was made, but it was discovered that the engine could not again be started.

Duesenberg Hard to Crank

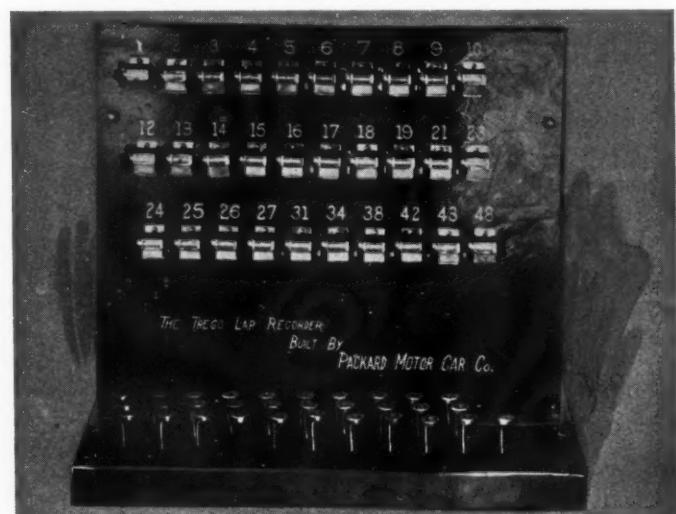
Man after man seized the starting handle and swung the high-compression engine until he gave way exhausted to another man who repeated the experiment. In the meantime Haupt was circling the track like mad and had gained up the 3 laps which separated the two, and was just a quarter lap ahead when the engine of the Duesenberg was finally started by jacking up the rear wheel and spinning it and then pushing the car off the jack while the wheel was spinning. Although Haupt made a valiant spurt he did not succeed in catching Carlson again, and ninth place was dedicated to the devotee of kerosene.

Altogether the race was the most remarkable one which has been held in this country during recent years. The high speed attained on a track which after 200 miles becomes slippery with oil are little short of marvelous. But the most remarkable part of all is the poor showing made by

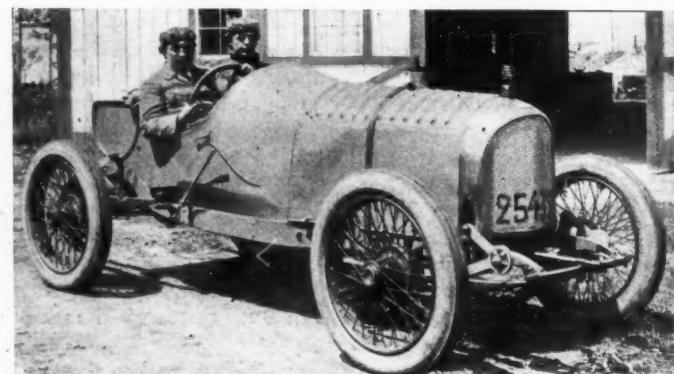
American cars. The fact that Thomas' Delage finished first is not as surprising to many as is the fact that Duray's Peugeot was second. This little car with its high-speed, high-efficiency motor with a bore of 3.07 inches and a stroke of 6.1, having a piston displacement of but 183 cubic inches, is an example of what the small motor can do. The stroke bore ratio of 2 to 1 is higher than any stock motor we have in this country, but it is not a long-stroke design alone that has done the work. Perfection in detail, balance and precision brought the little Peugeot into second place. The winning Delage was more than double the size of the little Peugeot. It had a piston displacement of 380.2 cubic inches, a bore and stroke of 4.1 by 7 inches, and yet this little car pushed the winner so hard that if he had had a

blowout or the smallest accident in the last few laps the little car would have won the first prize.

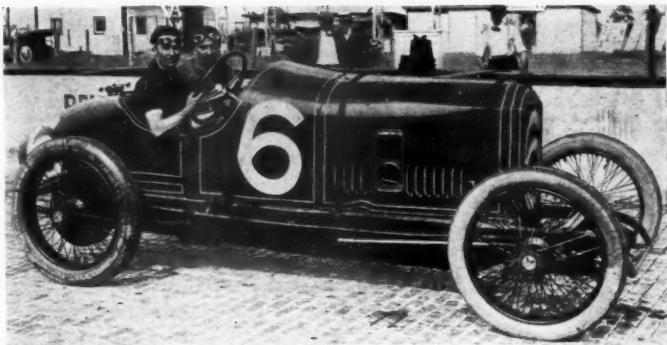
The car is owned by a Parisian, Jacques Meunier, a son of the Chocolate King, who purchased it last fall and uses it as a touring runabout. When Arthur Duray decided to visit Indianapolis he looked around for a possible car and



Frank Trego, of the Packard company, had an instrument for recording the laps made by each car. This consisted in a series of recording odometers arranged as shown above. These were operated from a keyboard.



Christiaens in his Excelsior, a pair that led through the first 50 miles of the race, and which threatened for a long time to pull down the prize for the first 100 miles.



Goux in the Peugeot, which finished fourth. A long series of tire troubles beset this driver, and he was forced to lose much time which he could not regain, in spite of the whirlwind time of some of the laps he reeled off.



Duray and René Thomas indulging in a \$37,000 handshake

meeting Meunier on the Boulevard asked him if he knew where he could secure a car. The reply immediately came that Meunier would loan Duray his little Peugeot. This was at once agreed upon and the car turned over to Duray, who took it to his own garage.

Good Balance and Workmanship

In this little motor there is nothing abnormal but rather its performance is explained by the general balance of the car, the good material used throughout, and the careful

workmanship. The pistons are turned out of a solid bar of B. N. D. steel, heat treated, and which after heat treatment has a breaking strength of 185,000 kilograms. Two cast-iron piston rings are used at the top.

The crankshaft is carried on three ball bearings and made in two parts in order that the center ball bearing can be properly fitted, is 2 inches in diameter at the main bearings and 1 4-5 inches for the crank pins. Counterweights are used for balancing it, these balance weights being integral with the shaft forging.

Castor oil was used for lubricating; a practice followed by the majority of the French drivers. With this lubricant it is possible to get 250 more revolutions of the motor per minute than with the best grades of other lubricants that were tried. The majority of the Frenchmen brought the castor oil over from France and used the best grade it was possible to secure.

The little Peugeot has valves 38 millimeters in diameter (1 inch is equal to 25 millimeters). The valve lift is 9 millimeters. The cylinders are offset 22.5 millimeters, or nearly 1 inch, from the crankshaft center.

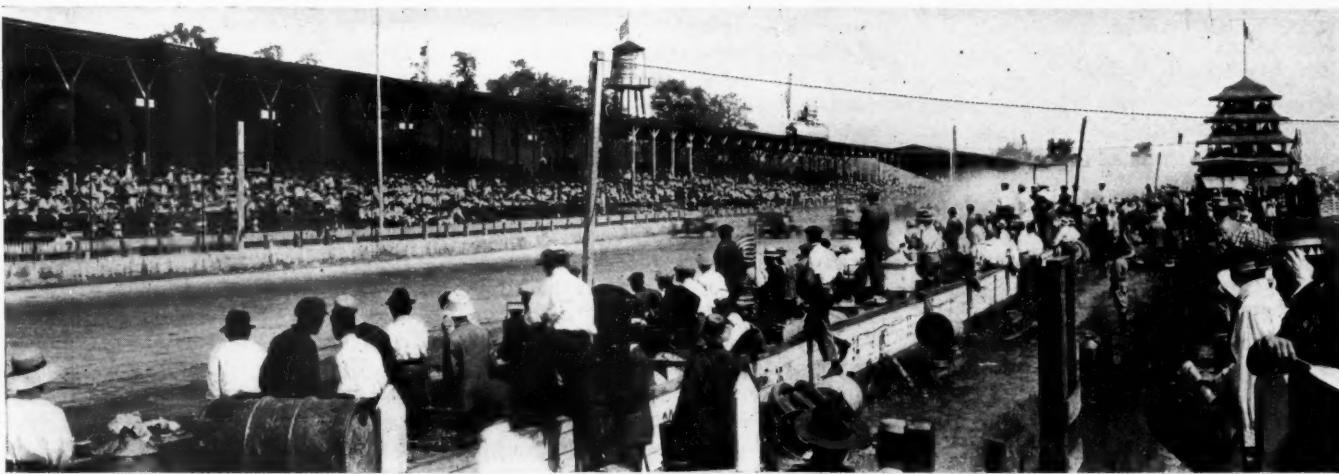
Delages, First and Third, Identical

The next car to finish, another Delage, had exactly the same piston displacement, bore and stroke as the winner, speaking well for the dimensions, construction and balance of these two twin Delage cars. The mere personal factor of different drivers or a tire change or two would be sufficient to equalize the differences in time made by the two Delage cars. It was an exhibition of reliability seldom equalled. The Peugeot driven by Goux is a smaller car than the two Delages, having a 3.9 by 7-inch motor, with 34.17 cubic inches piston displacement.

Barney Oldfield's Stutz, the first American car across the line, was a secret design that has not as yet been announced, except in the confidential reports made to the technical committee at the race.

Never did a more enthusiastic crowd gather to watch a sporting event than was at the Indianapolis speedway for the Decoration Day races. It is conservatively estimated that 100,000 people saw the races from the stands and from the infield parking space, and the probabilities are that this is underestimating the crowd. It was a patriotic gathering, and the American entries were cheered on by a crowd that longed to see an American win, but the crowning efforts of Thomas, Duray, Guyot and Goux received the heartiest applause. A thunder of cheers burst out from every throat when Barney Oldfield brought the first American car across the line.

(Continued on page 1180)



A view of the pits at the start of the race. None of the cars had as yet had to make use of them, and the pit hands are waiting, prepared for any emergency. In the background to the right is the pagoda devoted to the press and officials. From the press stand extends the suspension bridge from which the signaling was done. This kept the officials off the track and was in keeping with the Safety First methods of running the race.

Car, Truck and Accessory Plants Plan Increased Production

Factories in Cities Near Detroit Report Healthy, Normal Conditions and Flourishing Business—Some Find Night Shift Necessary—Others Far Behind Their Orders

Part IV

DETROIT, MICH., May 29—Healthy condition of factories in general is the keynote of reports gathered from a comprehensive trip to several of the principal cities outside of Detroit, but still close enough to be a part of the automobile industry's storm center. Brighter outlook for the coming year than has been the rule for several years past seems to be the consensus of opinion of nearly every factory head interviewed, and to one who has been in comparatively close touch with the general feeling for a number of years past, this is borne out by facts.

Nearly every factory has succeeded admirably in disposing of all or nearly all of its product and if there has been any slump in some of the months past, it has been fully made up for by the greater impetus of the warmer summer days and general awakening of the buying public to the fact that despite the outcome of the Mexican war, the tariff and the banking laws, they must have cars and can really afford to have them. There seems to be plenty of money for motor cars, but the public held on to it later this year, letting go all at once, so to speak.

Good Business in Jackson

Jackson, Mich., for instance, where there are several large interests devoted to the automobile, is evidence of a very successful 1914 season. The pay-rolls here are considerably increased as compared with the corresponding period 1 year ago. This is distributed over all of the plants, and is an indication of extremely healthy conditions, for the pay-roll is the first part of the factory to feel a slump.

Optimism Paramount Everywhere

Lansing, Flint, Pontiac, each of which boasts several well known plants, are all in the best of spirits over the outlook, and reflect on a

smaller scale the general favorable conditions found in the center of the industry—Detroit. Everywhere optimism is paramount.

Buick Having a Fine Year

The Buick Motor Co., Flint, Mich., has just completed the most successful year in its history. This company, which is one of the largest producers of low and medium-priced cars, manufactures in its own plant nearly every part of its vehicles. Due to the weeding out of unnecessary operations and the elimination of all waste working force, the Buick company has been able to give a better car for the money than ever before and this is largely responsible for the exceedingly good year. This efficiency of manufacture thus proves itself to be one of the greatest factors of success in the automobile industry as well as in any other industry.

The Buick company expects to materially increase its production schedule for 1915 and the new models will be on the market in August. The Buick market is all over the United States, there being no section which can be said to predominate in the consumption of the car. The Buick company also enjoys a good foreign business, but the number of cars shipped out of the United States as compared with the total number of cars built is not very large because the Buick company has always had a good demand at home and has not pushed its foreign trade.

The working force at the Buick plant is reduced somewhat just now on account of the completion of the year's schedule, and the lay-off is simply the usual procedure following the completion of one year's product and the start on another. When working normally the plant gives employment to 5,500 men.

Besides this large output of pas-

senger vehicles the Buick company this year turned out about a thousand trucks, which are on an entirely different chassis than pleasure cars. At the present time the truck department has to build only an exceedingly small percentage of its schedule and it still has 2 months in which to do it, viz., June and July.

Oakland Cleans Up Well

The Oakland Motor Car Co., Pontiac, will complete and sell every car it has built by July 1, although the fiscal year for this concern, as with all other General Motors properties, does not close until August 1. The Oakland sixes have met with a strong demand and there is no doubt that a greater proportion of them could have been marketed had they been produced. The concern did not get started on the making of its small sixes very early in the season.

In all about 7,500 cars will have left the Oakland shops for the 1914 selling year. At this time the Oakland company is figuring on a very large increase in output but does not care to say just exactly what this increase will be. The new models are expected to be submitted to the public on August 1.

The Oakland company did not attempt any foreign business until this year, although up to this time the concern has been sending a few of its cars abroad. But this year branches have been opened in London, South America and Australia and considerable success has met this entry into the foreign trade. The Oakland company has a good general trade all over the United States although, due to the fact that its output is not of very great volume, it has not gone in for general distribution in the smaller towns and cities, confining its representation to the larger cities and depending upon these larger cities to take

THE AUTOMOBILE

care of the surrounding territories in respect to supplying cars.

Olds Motor Works to Speed Up

At the Olds Motor Works, Lansing, Mich., where Oldsmobiles are made, the production of sixes for the year has been entirely completed and that proportion of the four-cylinder cars which was to be manufactured during the present year will be completed on schedule by July 31. The new four-cylinder model which has recently been added to the line has met with big success in all parts of the country where Olds has representation and makes it appear at the present time that some 7,500 cars of this model will have to be turned out. In all departments of the Olds plant they are figuring on greatly increasing the efficiency of production in order to take care of increased output without crowding.

Oldsmobile distribution is well taken care of in nearly all parts of the United States by well run branches and dealers. Little foreign business is done, principally because the concern can find ample market in the United States for nearly all cars which it produces. However, the Olds concern has a number of good representatives abroad and the cars are meeting with general satisfaction in Europe, where used. It is likely that foreign business will be sought after this year, probably more strenuously than in past years, although it is hard to tell just what the policy will be in this respect.

Reo 2,500 Behind on Orders

The Reo Motor Car Co., Lansing, Mich., anticipates that the demand for the Reo next year will be far in excess of that experienced this season, which in itself has greatly exceeded the supply. The concern is now 2,500 cars behind on orders, even though production this year has averaged sixty cars a day, which is considerably more than the concern has ever produced in the past. The Reo production for 1913 season was 7,813 cars, while for this year the schedule will be 13,000, or an increase of nearly 50 per cent.

In discussing the conditions, H. M. Lee, assistant sales manager, says that the Reo company knows very little about any depressions in business in general. If such exists the Reo company does not feel it, he states. "Such a depression should very materially affect our truck business, while the fact is it is growing rapidly and far exceeds business done by us at this period last year," says Mr. Lee.

Shipments of Model J Reo 2-ton trucks in May last year totaled thirty-six, while this year from May 1 to 21 the company has shipped sixty-one such trucks, and is in the neighborhood

of seventy orders behind on delivery, all of them being specified for immediate shipment. In commenting on this condition, Mr. Lee says, "We do not know of a stronger argument we can cite to evidence the prospects of the automobile business, and the Reo business in particular."

C. F. Rueschaw, sales manager of the Reo company, has been in the far West for the last 3 weeks and will remain there until the first of June. His object in making the trip is to size up the situation, and he has found all along the line that prospects were never brighter. Mr. Rueschaw further reports that excellent conditions exist on the coast and he looks for a business from that section for 1915 that will exceed that which his company experienced this year. Although the automobile business in California has not been quite up to par this year, still Reo sales there have been increased quite largely and the prospects for the immediate future are very bright.

Imperial Works a Night Shift

The Imperial Automobile Co. is now operating a night shift in order to supply the demand for their four and six-cylinder cars. Orders are now coming in from all sections as freely as in past seasons, with possibly the exception of small portions of the extreme Southwest, where sales have been somewhat curtailed owing more to the unusual weather conditions during the past few months than to any financial disturbance.

Both models of Imperial sixes are selling heavily, especially in the larger cities like Boston, New York, Chicago, and St. Louis, while the bulk of the four-cylinder car trade comes from the Middle West, which has always been the best field for Imperials.

Trade Is Good

Generally speaking, the Imperial company finds the trade very gratifying in all sections save the extreme South, and has reasons to think that its domestic, as well as foreign trade for the season of 1914 will be equal to if not greater than that of last year. While the demand seems to be toward a more moderate priced car, still sales have been heavy on Imperial sizes at \$2,000 and \$2,500, which seems to the Imperial company to be indisputable evidence that the six is going to be the coming car. Especially will this be true if a large number of light sixes are put on the market at a price around \$1,600, it is pointed out.

While it is a little early to make a complete forecast for the season of 1915, the best indications are at this time that a great many more motor cars

will be built in America next year than in any past year. Accordingly, Imperial has already begun to plan for a 50 per cent. increase in its production for 1915. This will be governed largely by final crop conditions for this season, which now seem to be far above the average.

For all sections over which Imperial solicits trade, the prospects for the remaining weeks of 1914 and the year 1915 are much better for heavy sales than they have been for years past, the concern states.

Jackson Finds Demand Steady

Howard A. Matthews, Jr., sales manager of the Jackson Automobile Co., Jackson, Mich., reports that his concern has had the biggest year since 1909, orders holding up in fine shape. In fact, there are more unfilled on the concern's books than is usual at this time of the year. In an ordinary year the commencing of a shut-off in demand can usually be seen about this time, but the Jackson company at present see no disposition to such a letting up of demand.

The Jackson company, according to Mr. Matthews, is operating several of its departments night and day. These are usually the machine shop and body departments, although occasion often demands to work other departments overtime to keep up with production. In all about 2,500 cars will be produced for the 1914 season, mostly of the four-cylinder type, the sixes being in small proportion. It is pointed out that the Jackson company did not market a small six this year and this may perhaps have some bearing on the fact that the four-cylinder output was much greater.

Distribution of Jackson cars is quite general all over the country, and there is also some foreign business. To be exact, about 5 per cent. of the Jackson cars produced are shipped out of the United States, some going to Australia, South America, South Africa and a few to European points.

In a word, Mr. Mathews says that business is in good shape and there is nothing to worry about.

Paterson Gains 33 per Cent.

W. A. Paterson, head of the W. A. Paterson company, Flint, Mich., long established in the vehicle business, and for a number of years identified with the automobile business, states that this branch is one-third better at this time than it was a year ago and is well satisfied with the outlook. The Paterson company is practically through with its 1914 schedule and is really working at this time on the 1915 product, which is expected to be on the market about June 15. Mr. Paterson is very san-

guine as to the future and believes that if there has been any slump in the business, that time is past. Like many other concerns, the Paterson company may have felt the temporary slowing up of business, but the greater impetus given it when things did open up has more than offset the dull period.

Most Paterson cars find their market in the West, although general distribution is enjoyed. California, with Los Angeles as the base, is a good market, while Kansas City and Des Moines are also bright spots. Active pushing of these cars in these territories is most marked and reflects the good representation there. Ohio and Michigan are, of course, very good territories, many Paterson cars finding a market close at home.

Mr. Paterson sees no cause for complaint and thinks business in an exceedingly healthy condition.

Cartercar Co. Gains 25 per Cent.

Relative to business conditions as pertaining to the Cartercar Co., Pontiac, Mich., H. R. Radford, general manager, states that while it is an accepted fact that general business is not exactly what could be desired, he sees nothing to worry about in connection with the automobile business. Mr. Radford says further that according to his observation every factory manufacturing a good car is experiencing no trouble in disposing of its product,

and many of them are building a good many more cars this year than last.

The Cartercar production is about 25 per cent. greater this year than last, and Mr. Radford points out that his company has not enough cars to supply the demand, nor has it had for the past sixty days. Sales of Cartercars for March and April and up to the present time this month not only equaled but exceeded a similar period of any previous year by nearly 50 per cent.

General Motors Truck Co. Doing Well

The General Motors Truck Co. finds the truck business a great deal better than it has been and conditions are improving steadily. In fact, the concern is breaking its production record this month, and considering the whole year has sold more trucks than ever before in its history.

Naturally the outlook for the future is very bright and extensive increases in production are planned. These can easily be taken care of, a 50 per cent. increase in volume of business being possible in this Pontiac, Mich., plant. J. C. Trumbull, assistant secretary, states that the prospects are brighter than they have ever been since the company entered the truck business. On January 1 of this year the prices were reduced and this one factor alone has, of course, been a great impetus to selling. The General Motors Truck Co.

does not build on a schedule extending very far ahead, but rather plans its production from month to month in accordance with the orders it has on its books.

The concern builds both gasoline and electric trucks, and it is stated that the demand for both types is about the same, although there is a little stronger sentiment in favor of the gasoline type just at this time. The concern can give no reason for this especially, but states that the demand varies, sometimes being stronger for one type and sometimes for the other.

General Motors trucks find a market all over the country. In fact, many orders shown the representative of THE AUTOMOBILE were widely separated. New York and San Francisco markets seem equally active. Orders for trucks from Peru and Australia in particular seem quite numerous. The foreign business in trucks, however, is not pushed for the reason that the American market will take practically the entire output without trouble.

Durant-Dort Trucks in Demand

J. D. Dort, president of the Durant-Dort Carriage Co., Flint, Mich., states that there is quite a keen demand at this time in the motor wagon department of the concern for both its 1,000 to 1,250-pound truck and its 1,600 to 2,000-pound model. This demand is very healthy at this time.

Chicago Companies Report Brisk Business

CHICAGO, ILL., May 29—While this city is the great distributing center of the motor industry, still it does not rank among the leaders as a car manufacturing proposition. However, Chicago houses several big concerns which figure most prominently as makers of accessories. Notably among these are the Stewart-Warner Speedometer Corp., making speedometers, vacuum gasoline systems, power pumps, etc.; the Stromberg Motor Devices Co. and the Findesien & Kropf Mfg. Co., making Stromberg and Rayfield carburetors, respectively, and the Woods Motor Vehicle Co., making electric cars. Each and every one of these concerns mentioned report that at the present time business is extraordinarily good and they look with optimism on the immediate future.

Overtime for Stewart-Warner

Operating three plants, two in Chicago and one in Racine, the Stewart-Warner Speedometer Corp. is employing nearly 1200 men, and so great is

the demand for the company's products that at the present time the three plants are working overtime. They are up to capacity, so that it is impossible to add more men, hence night work is necessary to keep up with the demand. The main plant in Chicago, on Diversey avenue, covers 12 acres of ground, while the plant on Wells street utilizes four floors. The Racine plant employs 400 men.

"We are running to capacity and right now we are 25,000 orders behind," says General Manager C. B. Smith. "Our capacity ranges from 2,800 to 3,000 instruments a day, quite a contrast to when we first started in November, 1906, with ten workmen. Then we were doing a fine business when we turned out half a dozen a day. The spring business started 3 or 4 weeks late, but now it is on with a rush and hardly will let up until July 1. We work overtime and are running to capacity."

"Our export business shows surprising growth and we are selling 10,000 instruments in England alone. I

should say that our export business has increased 25 per cent. over that of a year ago.

Business Is Brisk

"Business in our other lines is surprisingly brisk, too. We are making a vacuum gasoline system, which converts a pressure-feed system into gravity; we are making power tire pumps, a radiator meter and a cream separator speedometer. The vacuum system is making rapid strides, and by June 1 we will be turning out from 500 to 600 a day. Already we have booked with several of the large car manufacturers for this device as part of their regular equipment for 1915 and we expect to get still more of them."

"The power pump is coming in strong, and I do not hesitate to predict that in 1916 it will be part of the equipment of every standard make of car. This year we are turning out 25,000 and the demand is growing. The power pump will go a long way toward winning more recruits to motoring, men who dread the back-breaking

labor of pumping tires by hand and who heretofore have held aloof."

300 Rayfield Stations

As an evidence of the progress it has made in the past year the Findeisen & Kropf Mfg. Co., maker of Rayfield carbureters, announces that 300 service stations have been established at important points in the United States in the last 12 months. A year ago the company did not have one, but the expansion of its business resulted in the establishment of this chain of stations to care for the users of Rayfield carbureters.

At the present time the factory is working to capacity and 300 carbureters a day is the output of the plant, keeping 400 workmen busy, whereas a year ago 300 were employed and the daily output was 175. The plant also has grown or rather expanded. Within the year an additional 20,000 square feet of space was added, giving a total of 60,000.

"We have been running just 4 years now, so our present pace is most gratifying," says E. A. Bates, sales and advertising manager of the company. "Our business in this country has been uniformly good in all sections of the United States, and I anticipate that 1914 will show an increase of about

THE AUTOMOBILE

one-third over the business of 1913. We are doing a fine business in Europe, which we invaded during the past 12 months, and also we have gone into Australia with considerable success."

A new model G carbureter is about to make its débüt and it will stand as an improvement over the dashpot type.

Stromberg Made 10,000 in April

The April production of 10,000 carbureters of the Stromberg Motor Devices Co. was almost a record month for that firm. It was exceeded by only one other month in the past 2 years and May promises to be even better. The factory has been running overtime for a month now and is right up to capacity. From 375 to 380 men are employed in the plant, 100 more than a year ago, and prospects are bright. The company expects to have two new models ready shortly in which some radical improvements have been made.

"The accessory concerns are working abnormally now because of the slack time the latter end of 1913," says C. W. Stiger, general manager. "That slack time was not their fault, either. Car manufacturers slowed their production for 3 months until the shows, when they were reassured. Then they went to manufacturing with a rush. They tried to take up the slack, and in

consequence the accessory concerns were called upon for supplies and an effort was made to again get on a production schedule. Most of the makers have succeeded in this, but it has rushed every one. I look for future conditions to be about the same as they were at this time last year."

Woods Running to Capacity

The factory of the Woods Motor Vehicle Co. is running to capacity now and business for the first 4 months of the present year has been 10 per cent. better than in the same period last year. With the Woods company the record of sales indicates shipments. Considerable new territory has been developed of late, the Woods gaining in strength in Pittsburgh and also in Kansas and Oklahoma. Chicago, however, continues to be the stronghold of the electric industry. Here there are 4,000 machines in operation, it is estimated, more than any other city in the country can boast.

"Business in 1913 was fine up to July 1; then we noticed a slump," said L. E. Burr, president of the Woods company. "Then right after Christmas it picked up again suddenly, and during the holidays we did an unusual business. There has been no let-up and business has been good ever since."

Detroit Firms Show Big Increase Over 1913

DETROIT, MICH., May 29—Most of the Detroit factories building passenger cars and trucks and manufacturing accessories have already been reviewed in THE AUTOMOBILE, but, owing to the tremendous field to cover, a number of them have not yet been taken up. Herewith are reports directly from the factories of the Maxwell company and from those of the Zenith Carbureter Co.:

Maxwell to Build 60,000

The Maxwell Motor Co. has enjoyed a very successful year. The 1914 production is entirely disposed of, and plans are now under way for the turning out of about 60,000 cars for the coming year. Additional machinery and equipment will have to be added, and several new buildings may be erected in Detroit on some of the property which the concern owns adjoining its present plants in the city. This expansion will mean the employment of several thousand more men, it is stated.

"We are feeling particularly jubilant over the outlook," said President Walter E. Flanders. "The talks that I have had with our district sales managers, with many of our dealers and with our factory managers, and the talks that

Mr. Redden, our sales manager, has had with many people in the business, either representing us directly or indirectly, make me feel that we are entering an era of wonderful activity."

With the shipment of 175 cars on April 30, the Maxwell company broke all past production records for both daily and monthly output. A total of 3,200 cars were shipped in the last 30 days, and as there were only 26 working days in April, an average manufacturing schedule of 123 cars a day was maintained.

Speaking of this, Mr. Flanders says: "Problems facing us were the organization of an entirely new factory staff and the acceleration of production. That we have accomplished both is testified to by last month's output. To have increased manufacturing facilities from half a dozen cars to 175 a day is a record which could only have been made by the hearty co-operation of all departmental heads and the credit for this efficient work should go to them."

Zenith Increase 60 Per Cent.

At the plant of the Zenith Carbureter Co. production at this time had to be increased about 60 per cent. over the

corresponding period of last year. This increase was due to the increased output of the car manufacturers, who are steady users of the Zenith, and the securing of many new orders. The improved conditions reported by the Chevrolet, Hudson and Hupp companies, V. R. Heftler, president of the Zenith company, says, has made its effect upon his firm's output, which is now well above last year's figures.

Material Is Routed

The Zenith company moved into its new quarters last summer and the new factory is so laid out that supervision is made easier. The travel of materials through the shop is now effected without retracing any steps; some new and improved machinery has been added and all with the result that the schedule of increased production can now be carried out without any increase in the working force. This is but another reflection of the growing tendency to increased factory efficiency. It is a getting down to solid business management which means increased production, quicker filling of orders and, naturally, a much more satisfactory condition of affairs.

(To be continued)

Thermo-Syphon Cooling Most Efficient

The Automobile Engineers' Forum

Lyons Atlas Engineer Claims That This System Will Maintain a Constant Temperature in the Waterjacket and Renders Variation of the Cooling Surface Unnecessary

INDIANAPOLIS, IND.—Editor THE AUTOMOBILE:—In order to maintain the highest thermal efficiency in an internal combustion engine it is desirable to keep as hot a cylinder as possible. The amount of heat transmitted to the waterjacket depends upon the difference in temperature between the burning charge and the cylinder walls. If we could lubricate red-hot cylinder walls or walls of the same temperature as the gas during inflammation, there would be no heat loss to the jacket but, unfortunately, we must keep the cylinder walls about the temperature of boiling water to properly lubricate them, and the nearer we can maintain this temperature, the higher the thermal efficiency of the motor.

Complete Vaporization Primary Consideration

With low-grade semi-volatile fuel oils the more perfect gasification obtained by the heating of the charge before compression more than offsets the loss of imperfect filling caused by expansion; therefore a hot cylinder jacket under all loads is desirable and while it would be impracticable to use hopper cooling, in the writer's opinion, thermo-syphon cooling will not only maintain an evener temperature in the jacket during varying loads than pump circulation but if properly designed will eliminate the necessity of changing the cooling or radiator surface in different seasons.

While cutting down the cooling surface from the seat is possible, an automatic method of maintaining an even temperature in the cylinder jacket such as is obtained by the thermo-syphon system is far preferable and simplifies the work of the operator.

In the writer's opinion, any adjustments which can be left off without decreasing the efficiency of the unit is desirable, and for this reason he does not favor a cooling system which needs an adjustment of the cooling surface or a method of adjusting the surface.—C. E. SARGENT, Lyons Atlas Co.

Often the Brakes Fitted to Cars Are Too Light for Them

BRIDGEPORT, CONN.—Editor THE AUTOMOBILE:—During our years of experience in making automobile brakes, we have noted a great many cases where cars were not equipped with heavy enough brakes.

In reference to new brakes holding for any appreciable length of time, this has a great deal to do as to the method used when attaching the lining. In attaching Raybestos to brakes of our manufacture, the lining is drilled and countersunk about two-thirds of its thickness so that the heads of the rivets used for attaching are considerably below the surface of the lining.

A great many manufacturers simply press their rivets in, leaving the heads exposed or on even surface with the lining. Therefore, after the brakes are used for a short time the lining becomes smoothed off. Considerable of the frictional

value is lost owing to the heads of the rivets coming in contact with the drum surface, necessitating frequent adjusting of the brakes.

Where the lining is properly attached and countersunk as outlined above, the brakes will give more efficient service, and the owner obtains a longer wearing life from his lining than when it is attached simply by pressing the rivets in as mentioned.—THE ROYAL EQUIPMENT CO.

Brakes Are Often Rendered Inefficient by Improper Attachment

WILKES-BARRE, PA.—Editor THE AUTOMOBILE:—As axle manufacturers we quite frequently have inquiries in regard to brake troubles. In a good many instances when tracing the particular trouble down to the user, we find that almost invariably the average garageman does not appreciate that the brakes—no matter of what size, material or workmanship—will sooner or later wear out. This same garageman usually draws rather hasty conclusions, judging at a glance from the size of the brake drum and the total weight of the car without any further investigation as to the particular type of brake used.

Wherever cam brakes are used it is very essential that large diameter brakes of ample width should go with them. On the other hand, where the wrap-up type of brake prevails, the brake drum diameter and width can be considerably reduced due to the more uniform pressure and lower unit pressure per square inch than on the former type of brake.

The amount of wear that can be obtained from this type of brake is very surprising, which at a glance is admittedly very much on the small side.

Cam Brake Requires Stronger Drums

There are also other factors which have an important bearing on the wear and tear of the brakes. The cam brake for instance must always have considerably stronger brake drums in order to withstand the intense pressure localized at two points instead of being uniformly distributed on the circumference of the drum, tending at all times to make the drum elongate and quite out of round. The cam brake also calls for finer and more accurate workmanship in order to get an equal pressure on both shoes. Should the fulcrum pins or the cam itself be bored a little out of center or the brake shoes not properly centralized, we have not only an effect tending to elongate the drum but also an additional strain on the generally already overloaded wheel bearings.

Control Layout Often at Fault

With the wrap-up type of brake none of these conditions exist, and the wear is certainly more uniform and the lining has a much longer life than in the cam brake construction.

It might also interest you to know that the brakes themselves are generally condemned through a very faulty layout

of the brake rock shafts and linkages from the hand lever and pedal to the brakes themselves.

It is very often the case that a chassis designer will pay a great deal of attention to his control set and even to the brakes themselves but very little to the intermediary parts, and in some instances there is sufficient angular deflection in the long brake rock shafts and elongation and deflection in the levers themselves, with kinks in the brake rods, and pulling across the frame, etc., that the sum total has very much the same effect as if an actual spring had been introduced between the hand lever and the brake itself, with the result that there is so much lost motion that the brakes have to be set very close, which means more or less of a drag, greatly deteriorating the lining itself as well as lowering the efficiency of the whole chassis. This is particularly noticeable on electric vehicles, where a dragging brake is of such great importance. If more attention was paid to the rigidity of the parts between the control levers and the brakes themselves—or in other words, if the modulus of elasticity was considered instead of the stress per square inch in every part subjected to these strains, we would have very much more effective braking and considerably longer life than is at present obtained by the average user.—ARTHUR M. LAYCOCK, Chief Engineer, Sheldon Axle Co.

Waterjacketing Unnecessary Where Manifold Is Properly Designed

DETROIT, MICH.—Editor THE AUTOMOBILE:—When an engine is first started, of course the manifold and waterjacket are cold. Depositing of fuel may, even in a properly designed manifold, take place while running the engine at a low speed with the throttle partly open, as there is always a very great tendency for vapors to deposit on a cold surface and there is even a greater tendency to do so on the part of liquids held in suspension in air. This deposit would take place along the whole line of the manifold from the carburetor to the intake valve. Waterjacketing would not be of any benefit in this case, because the water would not yet be warm.

A second cause for depositing of fuel would be too low a velocity of the gases in the manifold. In this case, gasoline would deposit on the walls, and I have found it practically impossible to get a waterjacket hot enough to get rid of such deposit. If a manifold is designed for a proper gas velocity the fuel is carried straight through to the engine.

Surging of Gas Causes Trouble

A third cause of depositing is the surging of gas along the manifold from one cylinder to another. It is the general practice to leave the inlet valve open for a considerable portion of the return piston stroke. This is done to insure a more complete filling of the cylinder at high speeds. This arrangement is only of value above particular piston speeds and on low speeds with open throttle, when carried too far, causes a great deal of trouble. First, by permitting one cylinder to rob the other, inasmuch as one inlet valve is not closed before another one is open. Secondly, by allowing a return of gases through the valve when the engine is running at low speed with open throttle. This causes a change of direction of the gases in the manifold and causes fuel to deposit on its walls. Waterjacketing might affect this condition slightly by vaporizing part of the fuel deposit. If the deposit is slight it might vaporize the whole. If it were heavy it might not vaporize enough to give benefit.

In a manifold of proper size and shape waterjacketing could be of no benefit. With too large a manifold or one giving improper gas distribution, it might help to vaporize fuel deposited on its walls when running at slow speeds, provided the jacket was very hot.

Exhaust gas, if supplied through large enough pipes, is better than water as a heating agent.

Waterjacketing cannot be detrimental as it does not appreciably warm the mixture which goes through too fast to permit of this.

I would suggest that the time spent in designing the waterjacket for the manifold had far better be spent in the laying out of a manifold to give proper gas velocities and distribution and so that there should be no pockets for fuel to deposit in, and in designing cams and valves so that the suction stroke of an engine does its best work for those speeds at which an automobile is generally operated. Nine out of ten engines today are efficient only at speeds of about 1,200 revolutions per minute and up.

You will notice that I have used the term deposit instead of condense as there is really more trouble from the deposit of small drops held in suspension than from condensation of actual vapor.—GEORGE A. BREEZE, Zephyr Carburetors.

Best Method of Heating Mixture Depends on Manifold Design

DETROIT, MICH.—Editor THE AUTOMOBILE:—The subject of manifold length and jacketing is one that has been discussed very lengthily, and is one on which there seems to be but very little agreement of opinion.

Ordinarily heat must be supplied to the carburetor or to the mixture after it leaves the carburetor, to secure a workable degree of vaporization of the fuel. The point at which the heat is to be applied, namely, in the entering air, or to the manifold walls, to secure the greatest vaporizing effect, will depend upon the general layout of the system. If the manifold is short and direct, pre-heating the air is undoubtedly the better method. If the manifold is long or has a great many bends, it should, beyond question, be jacketed over as much of its length as possible.

There is no such thing in an intake manifold, as condensation. There very often is an accumulation of liquid fuel, at some point or points, but this fuel has not been vaporized in the carbureting system, and therefore its accumulation could not be considered the result of condensation.—P. S. TICE, Engineer, Holley Bros. Co.

Finds Short, Waterjacketed Manifold Best for Knight Motor

EAST MOLINE, ILL.—Editor THE AUTOMOBILE:—Our 4 by 6-inch four-cylinder Knight motor has a short, completely waterjacketed, manifold cast integral with the cylinder. We feel absolutely satisfied that the wonderful flexibility of our motor is partly due to the perfect mixture due to the even temperature of the manifold, also to its short length. We have prepared for preheating the air, but even during the past winter we have not found it necessary to do so. Without any question, for our work, the short waterjacketed manifold is ideal.—E. GRUENEWALD, Engineer, Moline Automobile Co.

Favor Waterjacketing Manifold and Heating Low-Speed Air

INDIANAPOLIS, IND.—Editor THE AUTOMOBILE:—Our engineers recommend, and are heartily in favor of the waterjacketing of the manifold. All our tests have shown that there is no loss at high speed, and there is considerable gain of power at low engine speed by waterjacketing the manifold. We find that in using the waterjacketed manifold, the heating of the low speed air is also advisable.—WHEELER & SCHEBLER.

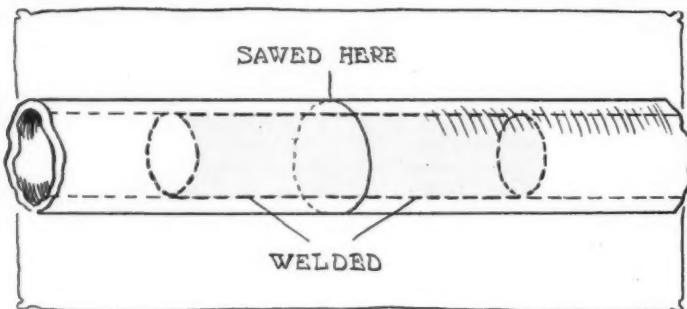


Fig. 1—Illustration of method of welding joint

The Rostrum

Cyclecars Will Make Air-Cooling Popular

EDITOR THE AUTOMOBILE:—The more I study the development of the cyclecar the more likely that it seems that further improvement in the design of the lighter cars that give promise of becoming so popular, will witness the adoption of the air-cooled motor for all except the very large machines.

While I have always favored the water-cooled motor a study of conditions as they are now revealed indicates that there is a very good chance of the air-cooled motor becoming more generally used than it ever has been.

In the past few years it has been conclusively demonstrated that with an adequate knowledge of gasoline motor design, with careful methods of manufacture and the use of good material that it is possible to construct a motor of about 4 inches bore, or less, that will operate just as successfully as any water-cooled construction. This has been proven by the great success of one manufacturer of automobiles in particular and also by the reliability of these motors on motorcycles, and the bore of some of the more recent motorcycles is very nearly 4 inches, although this may surprise some motorists.

It is interesting to note, here, that the air-cooled principle is never questioned by anyone when applied to motorcycles but when it is used on even small automobiles, the remark is generally made that air-cooling was tried several years ago by a great many automobile manufacturers and abandoned by them after several years of experimentation. Why, may I ask, "If air cooling is a success on a motorcycle with a given sized cylinder should it not be as much of a success on an automobile with the same sized cylinder?"

The conditions are not very different. While the motorcycle motor is exposed, the valves are arranged at the side and in the case of a twin the second cylinder is swept by the hot air from the first.

Automobile Has Advantage of Fan

On the other hand the automobile motor has the advantage of a fan and this more than offsets the superior exposure of the motorcycle construction. Nor is it necessary to use any particular kind of valves, successful motorcycle motors with bores approaching 4 inches have been made with all styles of valves and valve chambers and the result has been satisfactory.

Since cylinders up to this bore can be successfully air-cooled it would not be surprising to see the majority of the small cars, light cars and cyclecars propelled with air-cooled motors of either two or four cylinders. And further, to see the adoption of this motor with either four or six cylinders for five- and seven-passenger automobiles weighing from 1,500 to 3,000 pounds.

The trend in this direction can be seen in the large use of air-cooled motors for cyclecars at the present time. The satisfactory operation of these motors will overcome popular prejudice against them and there will be a demand for larger

cars equipped with engines of this type until finally all automobiles in the classes named will have them. The demand will become stronger as the lighter weight and the increased economy of the air-cooled motor is realized.

Against the successful air-cooled motor of today it is urged that if it has superior advantages why did so many manufacturers abandon it a few years ago. The answer to this is simple. The engines of that time were in most cases poorly designed and carelessly constructed of indifferent material. The details were not properly worked out. Furthermore the very cheapest cars employed air-cooling almost exclusively, and this was prejudicial.

Overhead valve constructions were the rule, and as the wearing parts were light, small and poorly lubricated the air-cooler was much more noisy than the water-cooled machine with its poppet valves. But today the overhead valve is as silent as any other poppet type.

American Design Followed Foreign

American design was largely influenced by foreign practice and as the machines of that day were much superior to ours, the fact that the foreigners used water, had great weight and besides the makers of the best American machines always used water. This all caused prejudice against the use of air. It was found hard to sell air-cooled machines although the best ones compared with the best water-cooled machines and for this reason several manufacturers switched from air to water.

Aside from the motor, a great many of these air-cooled machines had objectionable features, in fact most of the freaks of that day used air-cooling and this certainly had its bad effect. Some of them had strange bodies, others had peculiar forms of transmissions, freakish steering gears, etc.

To sum up, it seems to me that the light car movement will bring the air-cooled motor back into the public eye, that this motor will win popular favor by demonstrating its reliability, economy, and light weight and the result will be the adoption of this motor for all except the very largest machines.

New York City.

C. S. T.

Reasons for Using Block Castings

Editor THE AUTOMOBILE:—Kindly let me know the reason why so many of the leading manufacturers now use the following:

- 1—Cast cylinders in block.
- 2—Long stroke motors.
- 3—Left steering.
- 4—Full-floating rear axle.

5—Am I correct in my conclusion that practically all cars selling between \$1,500 and \$2,500 follow the above practice?

Edenton, N. C.

J. H. McMULLAN, JR.

—1—Cylinders cast in a block are used first because the

cost of finishing four cylinders all in one piece is less than when the cylinders are cast in pairs or singly for the reason that only one setting up is required to perform the different machining operations such as boring the cylinders and the valve guides, milling the lower ends to fit the crankcase, etc., while with cylinders in pairs each pair must be set up separately. Since the setting up takes a considerable amount of time and since it is just as easy to set up a four-cylinder unit as a two the advantage of the block casting is obvious.

When the cylinders are cast in a unit the overall length of the motor is reduced and the whole motor structure is stiffer because one cylinder takes, to some extent, the strains of the others. Furthermore, since the rigid cylinder block is bolted to the crankcase the one helps to stiffen the other.

Another feature of the block motor is simplicity in piping, it being possible to cast the manifolds and water headers integrally.

This not only eliminates the expense of the piping, which is however offset to some degree by the extra cost of coring the casting, but it gives the motor a very smooth and clean cut exterior.

2—The strokes used today are longer than those of a few years ago mainly for the reason that it has been found that there is no disadvantage in operating at higher piston speeds than were formerly believed to be desirable. The piston speed is equal to the number of revolutions per minute multiplied by twice the stroke, and in designing a motor these three factors: piston speed, revolutions per minute and length of stroke, are to be considered together and the final design must be a compromise in which these three are combined to best advantage for the conditions under which the motor is to operate.

1,000 Feet Piston Speed Thought Limit

A few years ago the maximum allowable piston speed was believed to be 1,000 feet per minute with 600 feet per minute as a conservative figure. This practice was in imitation of steam engine practice. But as the knowledge concerning automobile motor design has increased it has been found that this figure can be safely exceeded, and therefore not only has the motor speed been increased somewhat but the length of the stroke also.

3—Left steering has been adopted by the majority of the manufacturers for the reason that it is more convenient. It enables both front-seat passengers to enter or leave the car directly from the curb, while with right drive the passengers must climb over levers and tires or else walk around the car and enter from the left side.

Left steering is also an advantage on the road and especially in traffic. When a driver is behind an automobile or a trolley car that he wants to pass he can see whether the road ahead is clear while with right drive he must pull out into the path of oncoming vehicles before he can see the road.

4—The full floating rear axle is used because it permits the axle shafts and differential gears to be removed without taking off or jacking up the wheels.

5—Most of the cars in this class have these features.

Noisy Gearset Needs Grease

Editor THE AUTOMOBILE:—I have a Regal underslung roadster 1911 model and have experienced a lot of trouble by a loud grinding sound, while running on low and second gears, but after I shift into high the car runs perfectly quiet.

Could the above mentioned noises be caused by the gears meshing too deeply and if so, is there any way to set them farther apart?

This car was built for the race from Pittsburgh to Indianapolis and won it, beating the next closest man by three hours.

Freeport, Pa.

R. W. DRAKE.

—Since the sound is not present when running on high gear it is hardly possible that the bevel gear and pinion are making the noise. There are only two likely causes of the trouble. One is that the gearset needs grease and the other is that the bearings or gears are worn. There is no possibility of the trouble being due to gears meshing too tightly as there is no adjustment for moving the shafts towards each other.

Remove the top cover of the gearset and fill it half full of a medium grease, examine the shafts and gears and if there is much play in the former new bearings should be fitted, while if the latter are badly worn they should be renewed.

How to Mend Hollow Rods

Editor THE AUTOMOBILE:—When a drag link or other hollow rod used both for resisting tensile and compressive stresses becomes bent, a weakening kink is formed that is hard to get rid of, and the rod is always in danger of bending again under sudden force.

Where a larger size pipe can be slipped over the outside, after the bent rod has been straightened, the rod can be made stronger than ever by filling the space between the outer pipe and rod with lead or babbitt metal.

Where a pipe cannot be slipped over the outside I have found that a good repair method is to saw the rod in two at the strained point, open the inner space, making it as round as possible and then slip in a solid round length as indicated in Fig. 1. Then weld the tube onto the solid insert.

New York, N. Y.

W. F. SCHAPHORST.

Hum Caused by Tight Pinion

Editor THE AUTOMOBILE:—1—My car is a National series V. It has been gone over recently and everything made tight but I notice a very loud and harsh grinding and humming noise, issuing from the rear construction at speeds over 20 miles per hour. It is not in the bevel gears, but the noise seems to make about the same noise, that is, have the same pitch as the hum of the gears. Can it be caused by synchronous vibrations?

2—At present the car is equipped with a 15 tooth pinion and a 50 tooth gear. I would like to know if it would be possible to install a 17 tooth pinion without making any serious changes? The National people make a 17 tooth pinion. Just how could I make the necessary adjustments on this rear axle? How much does a pinion gear cost, approximately?

New York, N. Y.

FRED H. WELLS.

—1—Notwithstanding what you say, we still believe that the humming is caused by the pinion being set up too close to the crown gear. How did you decide that the humming noise was not in these gears?

Move the pinion a small amount away from the gear and see if the noise does not cease. This can be done by unscrewing the notched threaded sleeve shown in Fig. 2.

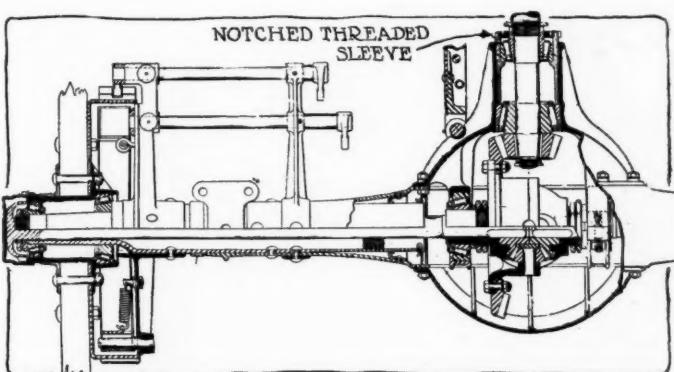


Fig. 2—National series V—rear axle construction

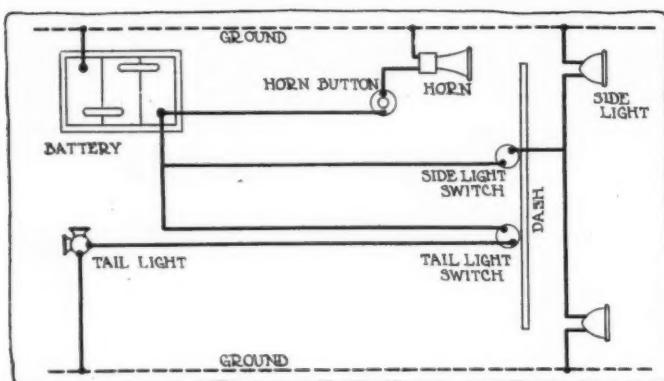


Fig. 3—Wiring diagram for storage battery circuit

There is no possibility of the noise being caused by synchronous vibrations, as you suggest.

2—In order to change the pinion to 17 teeth it will be necessary to buy a new gear to go with it. The price of the two is \$29.50.

The new gears can be easily installed. It will be necessary to remove the pinion and axle shafts but not the wheels.

Referring to the illustration the method of procedure is easily understood.

Remove the hub caps and then pull out the axle ends. Unbolt the differential housing cover and then take out the differential by unbolting the two yokes that hold the bearings in place. Take the old crown gear off and put the new one in place. Finally remove the 15 tooth pinion and install the 17 tooth one. Put the crown gear and differential case back in place and then adjust the gears so that they mesh properly.

How to Wire Car from Battery

Editor THE AUTOMOBILE:—Will you please show me how to wire my car for electric side and tail lights and horn, using a storage battery as a source of current?

Prairie du Chien, Wis.

ARTHUR KNOERZER.

—The diagram to follow is plainly shown in Fig. 3. Wires are led directly from the storage battery to the lights and the horn and the return circuit is grounded.

Wants to Put Ford in Race

Editor THE AUTOMOBILE:—I am planning to put my Model T Ford in a road race, and would like to ask you the following questions.

1—What gear ratio would be best to obtain the most speed and still be able to pick up quickly on corners? The course is 3.6 miles long, oblong with four right angle turns.

2—Could the camshaft be set ahead to any advantage?

3—Would it be better not to use the bottom piston ring?

4—How large and how far apart should I bore holes in the pistons?

Bridgehampton, L. I.

C. J. R.

—1—A gear ratio of 13 to 37 has been used with satisfaction and would probably be about right for this race.

2—Nothing is gained by setting the camshaft ahead but it would be a good idea to increase the lift of the valves 1-16-inch.

3—The question of using the bottom piston ring is of very little importance but it probably would be better to leave it in.

4—As the pistons are made of ordinary gray cast iron it would be best not to weaken them by boring holes. However, if you desire to make the reciprocating parts lighter this can be accomplished by turning excess metal from the piston interior. It is not advisable to drill them. In any case it would be well to bring the pistons and also the connecting-rods to exactly the same weight to reduce vibration.

The most important things are to see that the motor gets proper lubrication and that the spark plugs are made to withstand the heat. An oil tank that supplies oil to the crankcase by means of a hand pump operated by the mechanic should be fitted and enough oil should be fed to the motor at all times to cause it to smoke slightly.

Gear Clashing Caused by Quick Change

Editor THE AUTOMOBILE:—I have recently received a car which the makers state is geared 4.8 to 1 on direct and 7.8 to 1 on second. It is equipped with a four speed transmission. The gears shift fairly well from low to second, second to third, third to fourth and back from fourth to direct, but the shift from direct to second cannot be made without great noise at a speed exceeding 8 miles per hour. The change from second to low also occasionally rakes, but not seriously. The clutch does not drag. It is equipped with a brake, and tests have been made with the brake removed, set as tight as it can possibly be set and at all intermediate points but with the same results.

Is the trouble with the shift on this car due to the excessive speed of the sliding gears owing to the 4.8 reduction on direct being too high to make the shift, or if not, where does the trouble come from?

If the speed ratio on direct is 4.8 to 1, is the speed ratio on second, with the gears as given above, 7.8 to 1?

What change will make it possible to make the third to second without clashing the gears?

Port Henry, N. Y.

F. E. BACHMAN.

—1—Your difficulty can hardly be ascribed to any defect in the car but is merely due to the fact that you try to change gears too quickly. In order to make a silent change the gear peripheries must be traveling at approximately the same lineal speed and if they are not the rasping sound you mention must occur when the faster running gear scrapes its teeth against the gear it is about to engage until the former is brought down to the speed of the latter. Every gearset will emit the noise you describe if the shift is made too quickly or is accomplished without in some way bringing the gear rims to approximately the same speed.

Try shifting from fourth to third speed by releasing the clutch and speeding up the motor the required amount to drive the car at the same rate on direct that it was at a moment before traveling on high.

When shifting to a lower gear the same advice applies but in this case if the shifting is done on a steep hill it is important that the clutch be disengaged as small a time as possible. Therefore the simplest way to accomplish the shift is to hold down the accelerator pedal and release the clutch only enough to bring the motor up to the speed required by the lower gear. Then the shift is made as quickly as possible and the clutch speedily engaged again.

Questions on 1911 Corbin 30

Editor THE AUTOMOBILE:—1—Will you kindly tell me how to remove and adjust the front wheel bearings on a Corbin 30, 1911?

2—Also how to adjust breaker points on magneto on this car?

3—Will oil on the face of a cone clutch cause it to stick so it is very hard to disengage, especially after being in engagement for some time? If not what does cause this trouble?

4—What causes one cylinder to go flat or fire slow on a long hill. This trouble seems to grow worse as the speed of the car falls off and finally becomes a clean miss of one cylinder.

This car has a very long manifold with bad turns and a very short stroke motor.

Wakefield, R. I.

JAMES SHIPPER.

—1—The wheel can be removed by taking off the hub cap and the nut on the spindle end. F & S annular ball bearings are used in the front wheels and these are non-adjustable, therefore if they are worn they should be replaced. These bearings are imported by the J. S. Bretz Co., 250 West Fifty-fourth street, New York City.

2—The breaker points on the magneto on this car are non-adjustable. The magneto is a U & H, CB4 made in Germany. The construction is such that the adjustment is automatic until the interrupter mechanism is worn out. A new interrupter can be obtained from the Jesco Equipment Co., 245 West Fifty-fifth street.

3—Oil on the face of the clutch should not make it stick unless the oil is badly gummed. It is more likely that the clutch linkage needs lubricating or possibly some of the wearing surfaces in the linkage are gummed. Examine the clutch leather and if it is sticky wash it well with gasoline and then apply neatsfoot oil from time to time until the leather is soft and pliable.

Next look over the various joints in the clutch mechanism and if gummed oil is found on any of them clean it off with gasoline and then lubricate every part thoroughly.

4—From your description it would seem that as the speed of the car becomes less the missing occurs. In this case the trouble is most probably caused by a leak or by the spark plug points in one cylinder being too far apart.

If there is a slight leak from any cause whatever it will cause a miss at slow speeds while at higher speeds the gas has not time to leak out in sufficient quantity to prevent the explosion from taking place. This leak may be caused by worn or gummed piston rings, valves in need of grinding or push rods out of adjustment.

Too large a gap at the spark plug might be the cause of the miss and in this case the remedy is simple, it being only necessary to bring the points nearer together. The proper distance is 1-32 inch.

Look for Loose Connections

However it may be that the missing is not confined to any certain cylinder but jumps from one to the other. This may be due to an improper carburetor adjustment for low speeds or there may be an air leak into the intake manifold. This should be easily found upon examination but a more thorough test can be made by looking for the hole with a lighted cigarette. If there is a leak the smoke will be sucked into the manifold.

Dirt Gets Into Oil Cups

Editor THE AUTOMOBILE:—1—I have a 1913 model T Ford touring car and have had some trouble with the spring perch bushings and the spindle body and arm bushings wearing very fast, which seems to be due to the oil cups getting full of dirt and not permitting oil to get to the bearing surfaces.

2—Could those parts be fitted with compression grease cups, and if so would it be necessary to have another hole in the bolts in order to insure the grease getting to the bearing surfaces?

Hollywood, Mo.

W. J. HUNTER.

—1—The trouble is undoubtedly due to dirt in the oil which is caused by the oil cups being open. Possibly you have overlooked closing these cups up after filling them with oil or it may be that the springs that hold the covers closed are broken.

2—You could fit grease cups with very little trouble but if the oil cups are made to work properly this is not necessary. In case you decide to change, however, one hole will be found to be sufficient.

List of Trucks—5 Tons and Over

Editor THE AUTOMOBILE:—We have been looking into the advisability of using some form of truck to haul logs and

therefore we would like to have you give us a list of the reliable concerns manufacturing machines of 5 tons capacity or over.

Radford, Va.

A. J. H.

—Below is a list of the principal manufacturers of trucks, with capacities of 5 tons or more, together with the prices of these machines. Complete specifications and short descriptions of these trucks will be found in the Jan. 22 issue of THE AUTOMOBILE.

TRUCKS OF 5 TONS CAPACITY		
Name and Model	Name of Company and Address	Chassis Price
Atterbury—Atterbury Motor Car Co., Buffalo, N. Y.	\$3,500
A. I. C. C.—American Ice Mfg. Co., New York City.	4,500
Avery, B-5—Avery Co., Peoria, Ill.	3,600
Diamond, TG—Diamond T Motor Co., Chicago, Ill.	4,500
Garford, D—Garford Motor Car Co., Elyria, O.	4,500
G. M. C.—General Motors Truck Co., Pontiac, Mich.	4,500
B. A. Gramm, 5-ton—Gramm Motor Truck Co., Walkerville, Ont.	4,500
Horner, 5-ton—Detroit-Wyandotte Motor Co., Wyandotte, Mich.	4,200
Knickerbocker, 5—Knickerbocker M. T. Co., New York.	4,500
Lewis, 51—Lewis Motor Truck Co., San Francisco, Cal.	4,750
Locomobile, A—Locomobile Co. of America, Bridgeport, Conn.	4,800
Mack, 5-ton—International Motor Co., New York City.	4,000
Moore, 5-ton—Pacific Metal Products Co., Los Angeles, Cal.	4,500
Moreland, 5-ton—Moreland Motor Truck Co., Los Angeles, Cal.	4,500
Packard, 5-ton—Packard Motor Car Co., Detroit, Mich.	4,500
Peerless, 5-ton—Peerless Motor Car Co., Cleveland, O.	4,500
Pierce-Arrow, R-5—Pierce Motor Car Co., Buffalo, N. Y.	4,500
Pope-Hartford, 5-ton—Pope Mfg. Co., Hartford, Conn.	4,350
Stearns, 5-ton—F. B. Stearns Co., Cleveland, O.	3,800
Sternberg, 5-ton—Sternberg Mfg. Co., Milwaukee, Wis.	4,500
Transit, V—Transit Motor Car Co., Louisville, Ky.	4,500
Vulcan, 5-ton—Vulcan Motor Co., Anoka, Wis.	4,500
White, FC—White Company, Cleveland, O.	4,500

TRUCKS OF 6 TONS CAPACITY		
Couple Gear, AC—Couple-Gear Freight Wheel Co., Grand Rapids, Mich.	5,600	
Garford, F—Garford Motor Car Co., Elyria, O.	4,850	
G. V., FV—General Vehicle Co., Long Island City, N. Y.	.....
Kisselkar, 6-ton—Kissel Motor Car Co., Hartford, Wis.	4,500	
La France—Amer. La France Fire Eng. Co., New York.	5,500	
Mogul—Mogul Motor Truck Co., St. Louis, Mo.	4,700	
Packard, 6-ton—Packard Motor Car Co., Detroit, Mich.	4,650	
Speedwell, X—Speedwell Motor Car Co., Dayton, O.	4,400	
Sternberg, 6-ton—Sternberg Mfg. Co., Milwaukee, Wis.	4,750	
Saurer, 6.5-ton—International Motor Co., New York.	5,800	

TRUCKS OF 7 TONS CAPACITY		
Sternberg, 7-ton—Sternberg Mfg. Co., Milwaukee, Wis.	5,000	
Vulcan, 7-ton—Vulcan Motor Co., Anoka, Wis.	6,000	

Rank of Automobile Producing Countries

Editor THE AUTOMOBILE:—I would like to know the following:

1—Rank in order of automobile producing countries, (a) number of cars, (b) value of product?

2—Annual production of cars for U. S. each year since 1909. Estimated output for 1914?

South Bend, Ind.

H. VAN BUSKIRK.

1—The rank both in respect to number and value of cars produced is as follows:—United States, Great Britain, France, Germany, Italy, Belgium and Austria.

2—The number of cars produced yearly since 1903 with the estimated production for 1914 is shown graphically in Fig. 4.

It is interesting that the yearly increase since 1908 has been practically constant, approximately 80,000. Before this, the gain in production was very slow. With the advent of the cyclecar, next year should make the curve much steeper than heretofore.

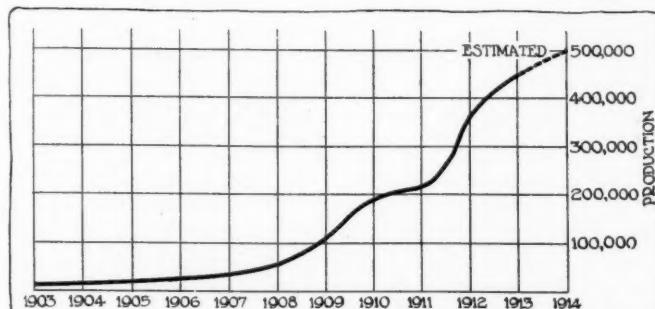


Fig. 4—Curve showing cars produced in last decade

Clipper Profit Sharing Plan Nearly Doubles Both Production and Wages

Belt Lacer Company Also Reduces Working Hours—Total Result of the Plan Is Increased Production at Reduced Cost

THE basis of every successful plan for internal industrial betterment must be the co-operation between the employer and the employee. When such a plan is carried out it not only succeeds in its immediate object but generally goes a step beyond and results in the cementing of relations between these two elements making each individual feel that he has a part in the whole enterprise.

A good example of a successfully worked out profit-sharing scheme is offered by the Clipper Belt Lacer Co., of Grand Rapids, Mich., a concern engaged in the manufacture of laces for joining the ends of belting.

Company Begins Operation of Plan

On the eve of Christmas, 1912, Charles P. Foote, president of this company announced a profit-sharing plan to cover the year 1913 and thereafter. All through the early development of this concern, it had been the aim of the management to at some time adopt a scheme which would result in the uplift of its employees and which would place them on a higher plane than that the average persons in this type of employment generally occupy. In 1912 a plan was tried out in one department only, the hook carding department. The girls at that time were assured that all increased earnings would be theirs and that the piece rate would not be altered no matter how much profit they made. The result of the experiment was that the girls, from earning their former wage of \$7.50 a week, increased their earnings to a point where the more skilled operators were making \$12 to \$15 a week and the less skilled averaged a little over \$10.

At the same time the output per operative was increased nearly 50 per cent.

Encouraged by this experiment the company announced an enlargement of the plan and widened its scope so as to take in the entire factory. An announcement of this was incorporated in a Christmas letter in which a statement of the work accomplished by the company was made:

Fellow-worker:—We have assembled here on the eve of another day that commemorates the birth of the Christ child, an event of great importance to us all, and which has much to do with that for which we are gathered here at this time.

Events have come along rapidly this year for us all, a great change having been made not only in our working place, but in the amount we have accomplished, and no small credit is due you for your part in it. The officers of the company wish at this time to thank you most sincerely for the interest you have shown, and ask that you accept with their best wishes for a Happy Christmastide, the inclosed little remembrance, which in a slight way expresses their appreciation of your loyal service, and their desire for its continuance during the year to come. For this, plans have been laid that should be of special interest.

When we started to card hooks, the young women were paid but \$7.50 a week. We believed them capable of earning more, and wished them to do so, consequently established a piece basis for their work, agreeing never to lower the basis, regardless of the amount earned. The results are well known. We are given to understand that they are now the best paid for similar work of any in the city.

We desire the same to be true of our other departments, and therefore have determined that we will, beginning Jan-

uary 1, next, put all departments (where practicable) on a piece basis, making it possible for all employees to use their heads as well as hands, to further their interests, increase their wages, and incidentally, our business. We here wish to assure them also that we will not lower the established piece price, regardless of the amount earned.

Ever since the manufacture of the Clipper was started, an accurate cost of every operation has been kept, and the price established for piece work will be based entirely on this cost, therefore making it not only possible for you to make exactly the wages you have been receiving, but to largely increase them with a little added effort.

We have no doubt that the balance of our employees will do exactly as did the young women, rise to the occasion and make it possible for us to pay them much more in the year to come.

But this is not all. A 9-hour working day will be established with Saturday half holiday during the entire year, without a reduction in pay. Also the management has felt for some time that employees so loyal and faithful, who had so large a part in making the business what it is, should share in its profits, and as a consequence has decided that beginning January 1 next, they should, and on the following basis:

All who at the end of 1913 have been with the company one year or less, will receive 5 per cent. (in cash) of the amount they have been paid during the year. All who have been 2 years in our employ, 6 per cent., 3 years, 7 per cent., and so on, 1 per cent. added each year until the amount has reached 10 per cent. where it will remain indefinitely, provided the profits for each year warrant it.

This you will notice makes you profit sharers in the business, and vitally interested in its outcome. You have, we believe, in the past year or more of service with us, done all you could to further our interests, but we trust in the year to come, this added profit will be an incentive for greater care and effort on your part.

How the Plan Worked Out

On closing the books for 1913 it was discovered that over \$3,000 were available for distribution under the plan outlined. One stenographer and one drayman earned the maximum 10 per cent. dividend. The dividends were placed in the pay envelopes Christmas Eve, 1913, with a little note expressing the gratification of the company that the amount was as large as it turned out to be and expressing the hope of still better things in the future.

The good will that this distribution engendered was an inspiration to the management and many instances came to their notice where this Christmas present helped an employee over serious trouble. Early in January the cottage occupied by one of the girls in the hook department was totally destroyed by fire. Not even the furniture or household effects were saved. The next day the girl and the mother called on the president and told him that but for the Christmas check, they would be paupers, for every cent they had in the world was in their home. They had never felt they could afford to carry insurance as they were making payments on the house, but when the Christmas check came they had decided that insurance on the home and contents would be the very best use to which they could put the money. The fact that they were insured was wholly due to the timely sharing of the year's profits.

Outside of the indirect benefit of a closer bond of fellow-

ship with their employees the direct results of the profit-sharing plan were as follows:

1—Yearly output nearly doubled with only a few more employees.

2—Cost of the belt lacer reduced 9 per cent. in spite of an increased wage of 20 per cent.

3—Output of one piece for which 20 cents is being paid on piece work so greatly increased that on the former daily wage basis it would have cost only 11 cents.

4—The average gain to operatives was 19 per cent. and the average gain to the company nearly 9 per cent.

5—The indirect gain to the company because of more hearty co-operation cannot be estimated in figures.

There will be no "labor troubles" in the Clipper Belt Lacer plant as long as the company continues to pursue the policy of giving their employees the large share of the increased earnings. A case in point was cited: One very capable workman was so embittered by real or fancied wrongs in

the old country and in earlier experiences in America that he was continually preaching anarchy and endeavoring to stir up trouble. He had consistently scoffed at the sincerity of the management of the company in their profit-sharing plan and had lost no occasion of warning his fellow workmen that this was only a trick to put a yoke around their necks. Fortunately he had few followers, as he was a comparative newcomer and the older employees trusted the management.

When he found over \$70 extra in his Christmas envelope, he went straight to the president's office and with tears coursing down his cheeks asked to be pardoned for all the harsh things he had said against the company. He is now one of the most efficient and loyal men of the whole force.

The plan will be continued in force indefinitely, and will, of course, become more extensive in proportion to the added years of service of employees who stay.

Decisions of the Courts—Collision with Freight Cars

IN New York a driver has a right to presume that when freight cars are to be backed down a track, a proper signal will be given, and a prudent man need not apprehend the fact that the railroad will not give a necessary warning, or that the necessity for the immediate stoppage of an automobile will arise.

A motorist sued the railroad company for the destruction of his car, which suddenly became stalled on a crossing and was hit by a train being backed down the track in the night. The rear of the train was unlighted and no signal was given of its approach. The motorist had crossed two tracks and finally his car became stalled on the third track. When it was hit by the train it was shoved about 300 feet and ruined. The reason the car became stalled was that a man suddenly appeared in front of it, and to avoid running him down the motorist stopped his car but stalled his motor in so doing. The Court held that the motorist was properly given judgment against the railroad company for the amount of damages which he incurred from the loss of his car.—*Packard vs. N. Y., Ont. & West. R. R. Co.* 160 A. D. 856.

Rights of Pedestrian and Motorist

Delaware Court says that a public highway is open to both automobiles and pedestrians and that an automobile owner has the same rights and must use the same care as other people on the highways.

A pedestrian sued a motorist for injuries by being run into by an automobile police patrol which was running at an excessive speed and which gave no warning of its approach. The Court said that the police patrol should have slowed up, or stopped, if need be, and that it was required to use more care in the crowded city streets than if it had been running in the suburbs, and for that reason the City of Wilmington was held liable to pay damages for the injuries to the pedestrian.—*Brown vs. Mayor and Council of City of Wilmington* 90 Atl. (Delaware) 44.

Not on Express Business

In a late Pennsylvania case the Court said that where a lawsuit is started for injuries received by being run down by an automobile a recovery can only be allowed from the owner when the chauffeur is acting within the scope of his employment and that there is always a question of fact for the jury to decide whether or not the chauffeur is engaged in his express business at the time of the accident.

In this particular case the action was for personal injuries caused by an automobile operated by a chauffeur. The owner denied that he had any knowledge that the chauffeur had taken the car out and maintained that the

chauffeur was not acting for him at the time of the accident. The chauffeur claimed that he was testing the car for the next day. The Court said the question should have been left to the jury to decide and for that reason reversed the judgment which the plaintiff had recovered.—*Curran vs. Lorsch*, 90 Atl. (Pennsylvania) 62.

No Lights on Car

In a recent case in Maryland the Court said that when one motorist sues another for injuries to his automobile and fails to prove that the latter is guilty of negligence and in addition is himself guilty of a violation of the statute which requires two front lights and a tail lamp, he cannot recover damages for injuries he suffers in a collision with the other car.

The motorist who sued came out of a court connected with the theater. His chauffeur blew his horn and a policeman signaled him to proceed. While running at a moderate speed a collision occurred with another automobile, which was somewhat damaged. Its owner brought suit for damages, but the Court gave judgment for the first motorist.—*Gittings vs. Schenuit*, 90 Atl. (Maryland) 51.

When Car Is Not Registered

The fact that a car is not registered must be shown by a person who is seeking to take advantage of that fact, and a motorist when he is sued for damages is not required to prove that his car is registered, because it is presumed so to be until the contrary is shown.

Court held in a case where the husband and wife sued for injuries, caused in a collision between an automobile and a trolley car, that where people hire a chauffeur who is not properly licensed to drive, they are acting unlawfully, but that it does not prevent them from recovering damages for their injuries in the case of a collision where, as in this case, they were run into by a trolley car, but it is evidence of the neglect of the chauffeur, as it bears on his fitness and skill in running the automobile. The people who were riding in the automobile were therefore allowed judgment against the trolley company.—*Conroy vs. Mather*, 104 N. E. 487.

Another Woman Driver

Massachusetts Court says that when a woman drives an automobile and fails to see a bicyclist ahead, gives no signal to warn him, and makes no effort to stop the machine, she is liable for damages for the injuries caused by running him down.

The representatives of the deceased sued the woman motorist and recovered judgment against her.—*Rovers vs. Philipps*, 104 N. E. (Mass.) 466.

Monarch Five-Passenger Six for \$1,400

Graceful Streamline Body and Wire Wheels—Horsepower Rating 30
—Fuel Tank in Cowl—Weight 2,400 Pounds—Equipment Complete

THE Monarch Motor Car Co., Detroit, of which R. C. Hupp, long connected with the motor car industry, is the head, has added a six-cylinder touring car of five-passenger capacity to its output of four-cylinder touring cars. The new six is a true streamline proposition and has most graceful lines. It is built upon the same general constructional basis as the fours, but the chassis is lengthened out and the tires are made larger. The price is set at \$1,400.

Standardization Is a Feature

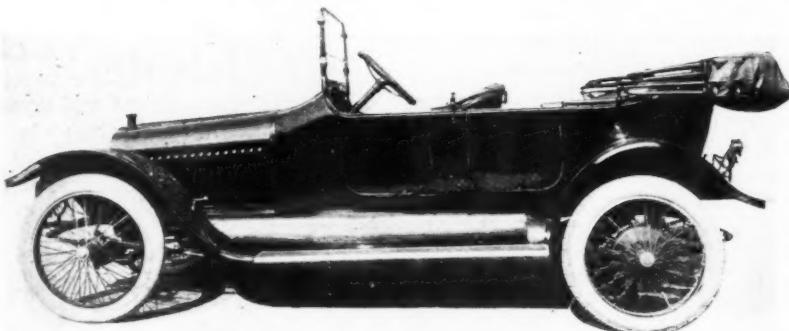
Standardization is the word with Mr. Hupp, and this is reflected in his cars. The motor of the new car is a Continental standard type, the rear axle is a Salisbury, the gearset comes from the Detroit Gear and Machine Co., the steering gear is a Warner, the wheels are of Mott make, and so on.

The motor is an L-head, block-cast type having the nearly standard cylinder dimensions of 3.5 inches bore and 5 inches stroke. This develops about 40 horsepower at a normal speed of about 1,200 revolutions a minute, although the S. A. E. rating accords it only about 30 horsepower. The motor and gearset with which it is combined are suspended conventionally at three points of the frame, one at the front and two at the rear.

The exhaust header attaches directly to the right side of the cylinder block with an individual opening for each cylinder, while the intake passes across through the casting from the opposite side of the engine. There is the usual short intake pipe from the carburetor running to the cylinder block, and distribution to the valve pockets is effected within the casting itself. This has the advantage of reducing external complication and is conducive to better mixtures since vaporization is aided by the passage through the jacket spaces. One special feature of note is the provision for the sending of warm air to the carburetor air intake. In the top of the cylinder block is cast a transverse passage open at the end next to the exhaust pipe, and joining at the opposite end to a tube connecting with the carburetor air intake. Thus, warm air from the cylinder head, as well as that from the exhaust manifold, goes to the mixing apparatus to further aid efficient vaporization.

Accessibility in Design of Motor

There is nothing out of the ordinary about the general construction of this Continental engine. The timing gears are housed fully at the forward end,



New Monarch Six with streamline body and wire wheels

and these gears have spiral teeth to insure quietness. Accessibility has not been lost sight of, however. The valve mechanisms are also completely covered by two aluminum plates, removable after the two thumb screws for each have been released. These plates are provided with openings in their tops, allowing for breathing from the crankcase up through the valve parts and out to the open air. The flywheel is entirely inclosed, but there is a cover plate at the top which can be removed for inspection and for checking the timing.

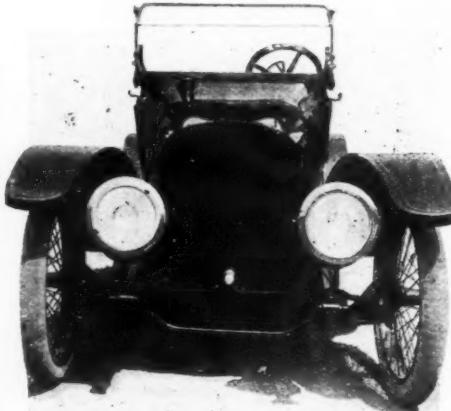
Latest motor engineering, of course, holds for the working parts of the motor, as well. The crankshaft and cam-shaft, both of liberal size, are mounted on three bearings each. The crankshaft, which is 2.25 inches in diameter, has a front bearing 2.875 inches long, a center 2.5 inches long and a rear 3 inches. The connecting-rods, also drop forgings, are provided with 2.1875-inch bearings. The pistons carry three rings and have paid due homage to the grinding tools and gauges before assembly.

The oiling system combines force feed and splash of the constant level type and the reservoir holds 1.5 gallons, a gauge on the side of the crankcase indicating the amount in the motor.

Auto-Lite Electric System Used

On the right side of the motor are the water pump and generator shaft. The pump is driven ahead of the electrical unit which is a part of the Auto-Lite system with which the car is equipped. Ignition and lighting functions are combined in that a Connecticut distributor is mounted, the coil of the latter being mounted directly back of the generator on the crankcase. The cranking motor is installed on the rear left side of the motor so as to be close to the flywheel which it drives in starting through teeth cut in the rim. The cranking motor is installed in connection with a Bendix automatic transmission which automatically engages and disengages with the flywheel on the pressure of a button. This Bendix apparatus utilizes centrifugal force to draw the teeth out of mesh after the motor starts. Its operation has been fully described in a previous issue.

Inclosed within the flywheel and gearset housing is a Hartford leather-faced cone clutch made from pressed steel and provided with adjusting springs which can be reached through a hand hole in the housing. The main clutch spring exerts a 225-pound pressure upon the clutch-cone, while a ball-bearing throw-out is also used. The



Front view of new Monarch Six

gears and shafts are of chrome-nickel steel. Gears have a .75-inch face.

The driveshaft is uninclosed and has a universal joint at either end. The rear axle is a semi-floating type of very strong construction, having brace rods and strong housing. The gear ratio is 4.33 to 1, which is low enough to give the motor fair play. On the pinion shaft, New Departure ball bearings are used, while Hyatt bearings are found on either side of the differential and on the outer ends of the axle shafts. The latter are made from 1.25-inch nickel steel and have a long taper on their outer ends where the rear wheels are fitted on. The axle housing is so designed that the cover can be removed for inspection without losing out the grease.

Two Radius Rods Used

External and internal brakes 12 by 2 inches act on the rear hubs, and the equalizers are arranged on two shafts. Two radius rods, one on either side of the driveshaft and running from the axle tubes to almost the center of the chassis, are used. These take all of the driving load.

The rear springs are elliptic and this feature tends to easy riding. These springs are underslung from the axle tubes, and are mounted outside the frame side members. The front springs are of the regular semi-elliptic form.

Wheels are of wire and carry large size tires, 32 by 3.5 inches front and 33 by 4 rear. The wheelbase is 118 inches.

The weight of the new Monarch is 2,400 pounds with full equipment.

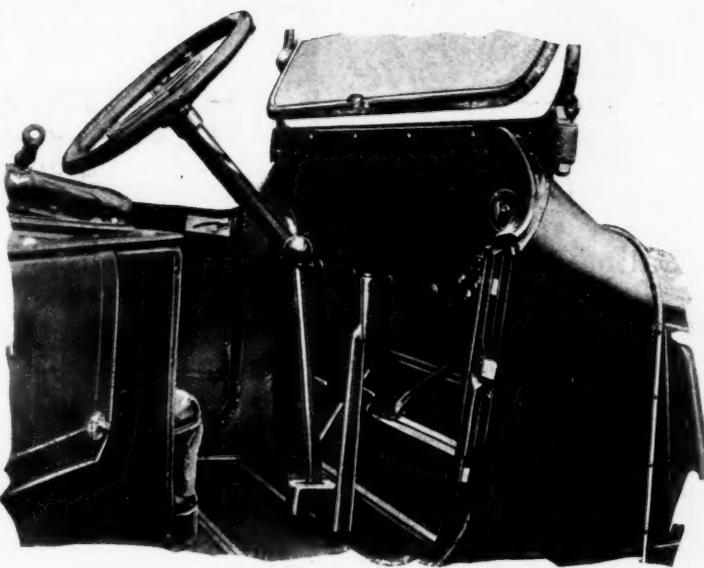
Gasoline Tank in the Cowl

Like the four, the six has the gasoline tank in the cowl, 10 gallons being its capacity. This tank is completely concealed in accordance with present day practice, and when in place is really a part of the body. The front seat may be entered from either side, and five passengers are easily and comfortably carried. Control is in the center and steering on the left.

The equipment is complete and includes Jiffy curtains, rain vision ventilating windshield, tire carriers, speedometer, headlight, dimmers, and so on.

Goodyear Has Examination for Employees

The Goodyear Tire & Rubber Co., Akron, O., instituted on January 1, 1914, a system by which every prospective employee is submitted to a physical examination. On this date all the employees then on the payroll of the company were examined in order that their physical fitness for the positions held by them would be fully determined.

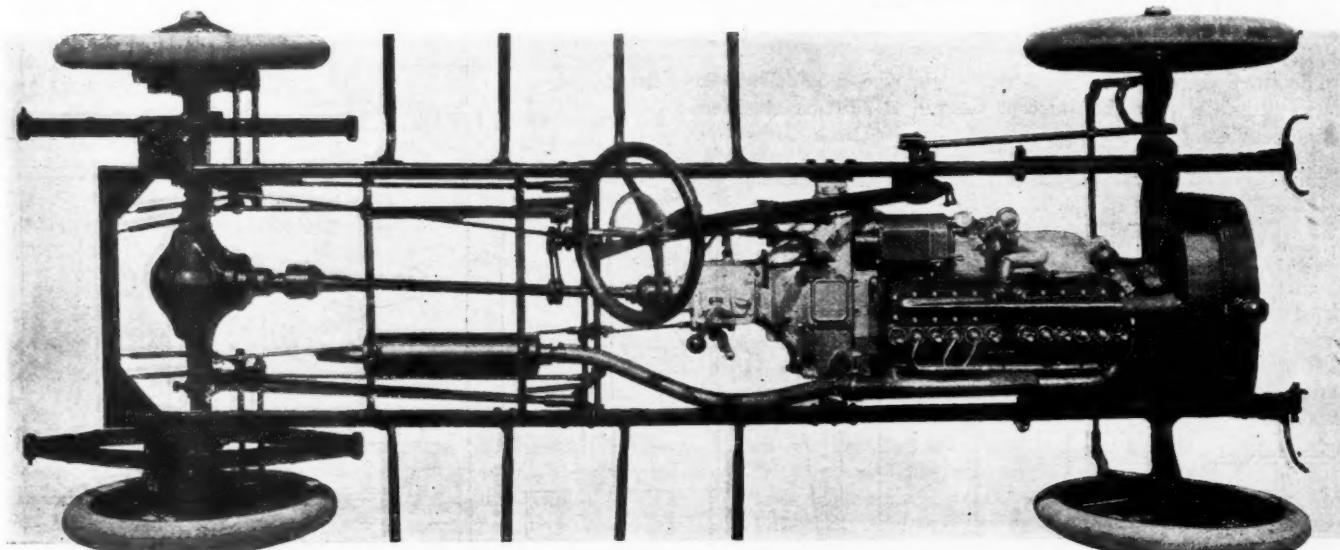


View of Monarch control and cowl board. Note left drive and center control

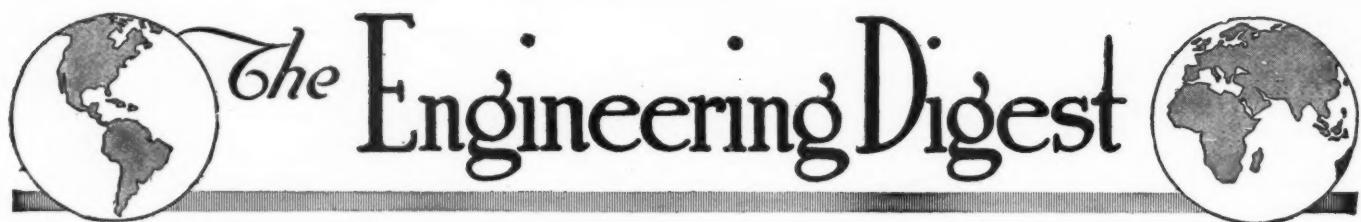
The discharging of employees who were not physically perfect is not a part of the Goodyear scheme and the examination itself is not so formidable as it sounds. The presence of various ailments revealed by examination does not necessarily bar candidates from employment in the company. On the other hand, the information thus obtained enables the placing of men where they will be most efficient and where they can work with a minimum amount of discomfort and with maximum returns for themselves. For instance, men subject to or suffering from hernia, can be given light, suitable employment.

Examination Indirectly Increases Output

The Goodyear plant employs about 7,500 men and, although this number is not greatly larger than the number employed during 1913, the output of the plant is practically double that of last year. The officials of the Goodyear company credit the physical examination work with a considerable share in the increased output of the plant. They state that many men's positions were changed at the beginning of the year when examinations were begun and, in every instance, those who were changed were benefited. No one is absolutely barred from employment by the examination, unless found suffering from contagious or infectious diseases.



Plan view of Monarch six-cylinder chassis. Note unit power plant, curved exhaust pipe and full-elliptic spring in the rear



The Engineering Digest

Calipers for Securing the Proper Alignment of Cylinder Borings

USEFUL FOR INSPECTION BEFORE FINAL GRINDING

WHILE special machines for boring all the cylinders of a motor at the same time include provisions for getting all the bores perfectly parallel and at right angles with the base of the casting, all motors are not bored in this manner and for the experimental work which must precede manufacture on a large scale the methods for obtaining perfect alignment of the cylinders necessarily include measurements. The latter must be so much more accurate as they must eventually serve as the foundation for the more nearly automatic jig work. In German practice it is found needful to measure the bores after they have been made while guarding against errors in the boring by insisting on the following conditions for entering upon the work: The boring machine must be very rigid, the chucks for holding the cylinder casting very substantial and accurate, the cutting-edges of the reamers must be of suitable angle and sharp and, finally, the cast bores must be straight. That the last-mentioned condition is seldom met is due to difficulties at the foundries in the placing of the cores, and any imperfection in this respect causes a variation in the thickness of the material to be removed under which circumstances the boring machine, unless its shaft is entirely free from play, cannot produce absolutely vertical and cylindrical bores.

For the measurement of the bores different calipers have been devised, and some of these are illustrated and described in the following:

The instrument shown in Fig. 1 comprises a plate A with the guides C in which the ruler B can be moved up and down. As the ends of the caliper pin DD follow the wall of the bore, the hand E, being the long arm of a lever pivoted at the middle of the pin, shows all misalignment magnified on the dial. This instrument can only be used for one diameter of bore.

Fig. 2 shows a device much more summary in its use, being meant only for measuring the thickness of the wall between two bores. This gives no absolute assurance of verticality.

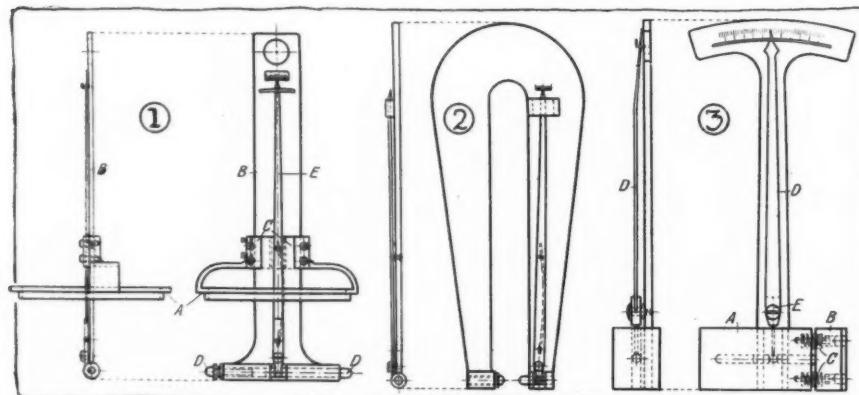
The third caliper, Fig. 3, measures each bore, and the two blocks A and B take the place of the pin DD in Fig. 1, their cylindrical surface serving at the same time to secure

verticality. If any irregularities are present, the block B indicates its movements in relation to A by turning the hand ED around E.

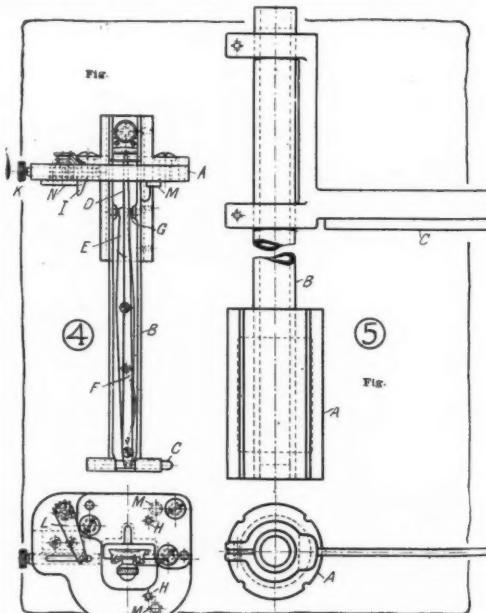
Fig. 4 represents a refinement and elaboration of the principle applied in the first device, but is rather complicated and expensive. It measures diameters from 100 to 125 millimeters. The plate A is composed of two parts so that the guiding-groove for the ruler B may be machined more easily. The knurled button shown most plainly in the plan view serves to move the ruler up and down, and when this movement is made the pin C shows by means of hand E, as before, every deviation from parallelism and verticality; in this case magnified 25 times. The screws G serve to adjust the hand for different diameters of bore. The instrument is centered in the bore by means of the two fixed pins HH and the movable pin I, the latter mounted upon the sliding-piece K which is always pressed outwardly by the lever L and a coil spring. The pin M and the chamfered lug N provide supports of such small area upon the base of the casting that particles of dirt or metal shavings on the latter are unlikely to interfere with the correct vertical adjustment of the device.

Fig. 5 shows a much simpler instrument but one which again can be used only for one diameter of bore. The cast-iron cylinder A fits exactly in the bore and in it is mounted rigidly the seamless tube B around which the ruler C can be turned. The latter has a sharp edge and is so adjusted to B that it just touches the cylinder flange. By turning C around, it is thus easily shown whether the flange is vertical upon the bore.

The last caliper, shown in Fig. 6, is in constant use in one of the largest automobile factories and combines simplicity with completeness. The base plate A carries the riser B in which the pivot C for the measuring-lever D is secured. For convenience in the making, plate A is also here made in two parts. The pivot C lies somewhat below the plate, so that the pressure brought to bear against the upper measuring surface a of the lever arm, to get it in



Figs. 1-5—Measuring instruments from German factories more or less adapted for ascertaining if cylinders are bored straight and parallel



contact with the wall of the bore, is taken up directly by the bolt. The lower measuring-surface *b* is pressed constantly against the wall of the bore by means of the coil spring and deviations from the cylindrical form and from verticality are thus both shown by the index at the top of the lever arm. [Assuming this to be the best of the instruments described, experience must have shown, it seems, that it is unnecessary to look for irregularities between *a* and *b* if the measurements at *b* show true form.—ED.]—From *Werkstatttechnik*, May 1.

Britain Beginning to Form a Reserve of Motor Trucks

THE British government some time ago decided upon a scheme for subsidizing gasoline motor trucks for use by the War Department "in case of national emergency." The details of the plan are in substance as follows: Purchasers of vehicles of the types which have passed War Department trials can obtain a subsidy of £110, £30 of which are paid to the owner when the machine is enrolled and the remaining £80 in six half-yearly instalments. Two classes of trucks are accepted, one to carry 3 tons of useful load and the other to carry 30 cwt. of useful load. In the event of a national emergency the War Office has the right to purchase such vehicles at prices fixed by a schedule, payment being made immediately the vehicle is handed over.

Construction features which it is desired to standardize in this class of motor trucks are the gear-changing mechanism and control, the road clearance, which must enable the vehicles to ford streams 18 inches deep, the tare weight and the means for protecting the loads by covers and under-shields.

Neither chain nor worm gearing has so far met with favor at the War Office for the final transmission to the road wheels, but numerous makers are ready to meet the drastic requirements and will fit bevel-gear driven rear axles. These makers include Leyland Motors, Thorneycrofts, Wolseleys, Walker Brothers, Claytons and Huddersfield.

Several machines built to comply with this scheme are now undergoing tests on the public roads. They are all of the 3-ton type, with one exception, but for the test on the day when they were specially observed they carried loads of 4 1-2 tons net in order to sample their hill-climbing capabilities and the brake action. Two of them, a Dennis and a Thorneycroft, were fitted with worm gearing, this feature being not definitely excluded.

The War Department specification for gear ratios is as follows: Low speed 5 to 5.3 to 1; second speed 2.9 to 1; third speed 1.7 to 1; high speed direct. These ratios at a motor speed of 1,000 revolutions per minute give road speeds of 3.2, 5.5, 9.4 and 16 miles per hour.

During the tests so far there has been no material difference in efficiency as between the machines driven with bevel gears and those with worm drive, and it is considered possible that the War Department may extend its specifications so as to include the latter.—From *The Engineer*, May 15.

Sample Trunk or Baggage Trailer for Light Cars

WITH a view to the needs of commercial travellers and tourists there has been placed in the market in Germany an especially simple and inexpensive trailer platform which may be readily attached to an ordinary small car and which will hold the sample cases or extra baggage for which there is ordinarily no room in vehicles of this class. The rear of the trailer is supported by means of a single wheel

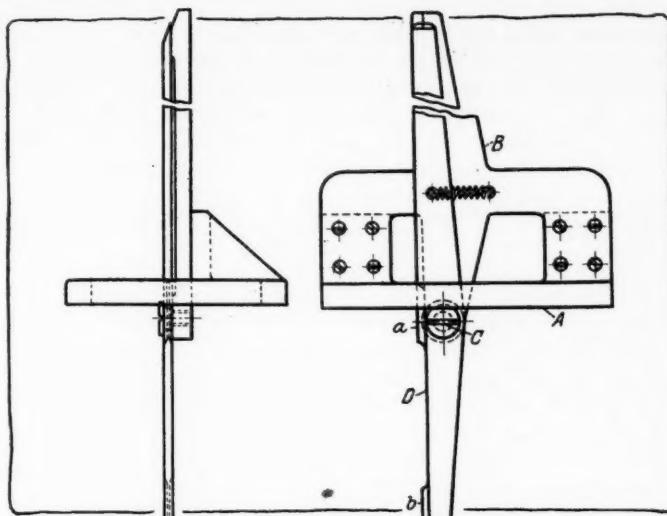


Fig. 6—Best German device for quick inspection of cylinder bores

held in a fork extending, with considerable rearward rake, from the rear portion of the trailer platform, where the fork is secured in the manner of a caster but with the caster movement impeded by means of a strong coil spring which also gives vertical cushioning. In addition each of the fork ends is connected to the axle of the wheel by a coil spring, the movements of these springs being guided in planes parallel with the wheel plane. The front end of the trailer platform may be secured to the car in different ways, according to the construction details of the car, but the fastening is here under all circumstances rigid, so as to make the platform practically an integral portion of the chassis. All the operative requirements are said to be met, even at high speeds and when the car is run backward. The device, as intended for tourists, weighs 100 kilograms and is sold for 600 mark (\$150), this including two folding-rests at the front of the platform; these rests, when dropped, supporting the platform separately and permitting it to be loaded and unloaded apart from the car.—From *Allgemeine Automobil-Zeitung*, May 2.

Development of Spring Moderators and Rebound Checks

THROUGH the changes effected in popular models of spring moderators from year to year the trend of the mechanical requirements relating to these devices is illustrated, while it is at the same time shown what difficulties exist in the matter of making any once device meet the actual wants for all kinds of vehicles. The latest model of the Houdaille so-called "compensated suspension" device, which has gained considerable popularity in France, England and Germany, largely through its simplicity, its robustness and the readiness with which it may be applied to most cars, is thus made notably more substantial than formerly, indicating the very severe stresses to which such a device is subject. Its provision for automatically replenishing the working oil from a "compensating chamber" is now a leading feature while in the first models it seemed more incidental, the enlargement of the feature apparently indicating that the pressures tending to produce oil leakage along the main shaft of a hydraulic spring moderator are important and that users object to being burdened with any maintenance care to keep the oil supply intact. The present prominence in the markets of the world of the simple rebound strap, which is cheap and not troublesome, argues for the importance of the same point, so long as the devices for which it is claimed that they do better work than the straps can do are not so fully standardized in their mode of action as to inspire full confidence in the correctness of some one

principle—more fully developed than that of the rebound strap—for moderating the oscillations of the vehicle springs. It is noticed that the latest model of the Houdaille is quite thick and that the two stuffing-boxes, well apart on the shaft, are of what the French call "serious" dimensions. The competition with the simple friction type of spring moderators, usually termed shock absorbers, seems, therefore, to be considered less important than formerly, the convenient thinness and unobtrusive appearance of the friction type being no longer imitated.

Clash of Opinions

The Houdaille works on the principle of checking the extension of the spring from the moment when the compression is at its maximum and regardless of whether the compression is small or large, depending upon adjustment of the checking-valve for bringing the severity of the check in consonance with the flexibility of the spring, the load it supports and the weight of the unsuspended running-gear. As the oil contained in the mechanism resists displacement at a rapid rate more energetically than at a slow rate and the severe shocks are received mostly during rapid driving, it is a commonly mentioned objection to the Houdaille system, and any other system by which the extension of the spring is checked from its beginning, that the wheel and axle are taken back to the best position for receiving a fresh shock the more slowly the more need there is for haste; rapid driving being more likely to bring a new shock in quick succession than slow driving. But against this criticism it is maintained that only average conditions can be met and that rapid driving over a road of a somewhat uniform roughness causes less violent spring oscillations than slower driving, while in the case of a shock from an exceptional road obstacle, which is not likely to be repeated at once, the spring will be returned to equilibrium rapidly enough even if the checking of the spring extension begins when the extension begins. According to Bobeth's experiments the spring oscillations are of the greatest magnitude on the average road at a vehicle speed of about 22 kilometers per hour and decrease considerably at higher speeds, the results depending largely on the flexibility of the springs and the weight of the unsuspended parts. These considerations still leave the question of the best system for spring moderators in considerable doubt.

Details of Popular Device

The main features of the latest Houdaille device are shown in Fig. 7. It consists of boxing A in which a shaft B follows the movements of the vehicle axle, by means of the usual levers with rounded joints, and integral with the shaft are two rotary pistons CC. At right angles with the rest-position of these pistons there is a fixed diametrical partition E with the ball valves DD. The box is filled with castor oil, and, when the vehicle spring is compressed and the rotary pistons are turned around, the liquid is forced, with-

out important resistance, through the valves DD from the compartment whose volume is being reduced into the adjoining one whose volume is being enlarged. When the spring extension begins, the ball valves close automatically and the liquid, having no other large exit, is forced through relatively small bores II and JJ in shaft B, these channels also connecting adjoining chambers. The resistance met in these channels is regulated by an oval button G which can be turned to obstruct the channels more or less, being secured upon the end of a spindle F, which fits tightly in a central bore in the shaft B, reaching the exterior of the mechanism where it can be adjusted by applying a screwdriver to a kerf in the end of it.

The provisions which serve at the same time for brute strength of the device and to keep the working-compartment permanently full of oil are as follows: The screw cover for the box in which the pistons work is formed with a neck giving support for the stuffing-box L, and the space around this neck is utilized to create the "compensating-chamber" by threading the cup K on the box A. The cover plate has ball valves (marked CC in the horizontal section) permitting communication from the compensating-chamber to the piston compartments but not in the opposite direction. If any oil is lost from the working-chamber the tendency to a vacuum draws oil to replace it from the compensating-chamber, so long as the latter is half-full. It has an aperture with a screwcap, for filling, at its top. Shaft B is grooved transversely to form better joints with the packings NN, and a small bore f is provided, by means of which any oil which might escape from the working-chamber along the shaft may flow into the compensating-chamber. The oil in the compensating-chamber is of course not subject to pressure, so that no great demands are made upon the outer packing; still the packing in its entirety works to some extent as a friction device, but the compensating system makes it possible to have the packing less tight than it otherwise would have to be. It is stated that no cast part enters into the construction of this device and that, on the contrary, to secure the needed strength every part is made of specially treated steel.—From *Omnia*, May 23.

Do Pivoted Rear Springs Affect the Driver's Comfort?

WITH the standard spring suspension and distribution of weights in an automobile, the front seats are most comfortable and the seats of honor in the rear receive the road shocks most directly. "The cantilever suspension," says *La Vie Automobile* of March 7, "remedies this somewhat illogical state of affairs. Without detracting much from the comfort of the front seats it lends to the rear ones a sweet indifference to jolts which was formerly very rarely experienced." The reason for supposing that the comfort of front seats may be affected by a cantilever spring whose free end points rearward—which is the kind referred to, and not the Bugatti type—lies in the downward thrust at the front shackle of such a spring which is applied every time the rear axle is jolted upwardly and which is transmitted through the frame to the front springs.

THOSE who believe that the rotary type of motor so largely used for aeroplanes is intrinsically very costly to manufacture will be interested to learn—from the commercial information column in *La Pratique Automobile*, May 10—that the gross receipts of the Gnôme motor company for 1913 amounted to 10,640,000 francs, as against 6,338,000 francs for 1912, and that the net profits were 8,640,000 francs in 1913 and 5,258,000 francs in 1912. Thirty per cent. of the net profits, or 2,400,000 francs, is distributed in dividends.

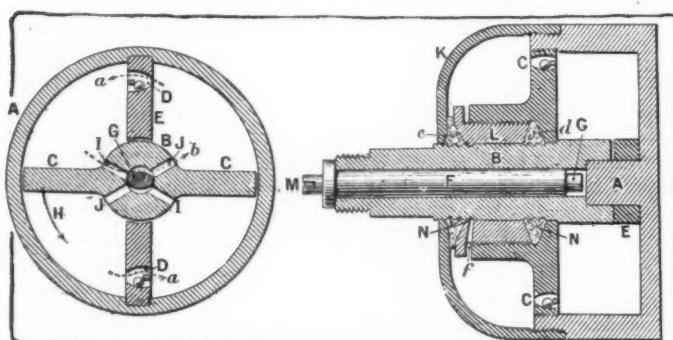


Fig. 7—Transverse and longitudinal sections of Houdaille hydraulic rebound check and shock absorber

New Books for the Engineer

Works on Chemistry of Rubber — Mechanical Drafting and Other Important Subjects

THE past few weeks has witnessed the advent of several books that should be of interest to the engineer and particularly to the specialists in certain lines of work allied with the automobile industry.

There is an up-to-date book on the chemistry of rubber for the advanced student in this branch of endeavor, a book on mechanical drawing that should appeal to both the draftsman and the student, and a work entitled, "The Inventor's Adviser and Manufacturer's Handbook" that should be a valuable reference book for patentees.

THE CHEMISTRY OF RUBBER. By B. D. Porrit, D. Van Nostrand Co., 25 Park Place, New York City; 96 pages, including bibliography and index; cloth, 75 cents.

This is a monograph which is intended for those interested in rubber from a chemical point of view, and the description of technical practice has, therefore, been limited to the details necessary for a clear insight into the chemical questions involved.

The book has been prepared with the idea of presenting a digest of the latest and most up-to-date material on the subject. The progress of chemistry is so rapid that it is becoming a matter of ever-increasing difficulty to keep abreast of the modern developments of the science. The volume of periodical literature is so enormous that few can hope to read, far less assimilate, all that is published. The preparation of summaries therefore becomes a necessity and has led to the publication of various well-known journals devoted to the abstraction of original papers. For obvious reasons, however, these do not fully supply the wants of advanced students and research workers and it is now generally recognized that monographs on special subjects are also needed.

Such is the purpose of this book which is one of a series by well-known authorities on chemical subjects.

WORKING DRAWINGS OF MACHINERY. By Walter H. James and Malcolm C. Mackenzie, John Wiley & Sons, Inc., New York City. 8vo, 143 pages, 199 figures, 23 plates; cloth, \$2 net.

While this work has been planned especially to meet the needs of students of drawing in the Department of Mechanical Engineering at the Massachusetts Institute of Technology the material is of such a nature and is presented in such a way that it fills the need, which has always existed, of a book devoted especially to machine drawing for a suitable reference book for draftsmen and schools.

It is not an elementary text book on mechanical drawing but rather a treatise on the application of mechanical drawing to the describing or the designing of machinery.

The assumption is that the reader is already familiar with the use of drawing tools and has some knowledge of the principles of projections. The aim of the book is: to give a correct conception of the character and purpose of a working drawing; to suggest the relation between a pictorial drawing of an object and its orthographic projections in such a way that the student will naturally fall into the habit of forming a mental picture of a piece when he sees its projection and vice versa; to illustrate modern methods of representation, dimensioning, drafting room systems and the like

and to suggest a method of attacking some of the problems in design; and finally to explain the common methods of pictorial representation from the standpoint of the engineer.

The appendix contains much useful data for reference such as bolt dimensions, S. A. E. nuts, taper pins, keys and tables and standard gauges in decimals of an inch.

THE INVENTOR'S ADVISER AND MANUFACTURER'S HANDBOOK. By Reginald Haddan, Harrison & Sons, 45 Pall Mall, London, Eng. 470 pages; cloth.

Written by the head of a firm which has had a half century's experience in acting as consulting engineers to patentees, it is a valuable work for the information of the inventor. It is a guide to the commercial development of inventions, their protection by patents at home and abroad and the valuation and disposal of patent rights.

It includes particulars concerning the patent laws and practice in not only Great Britain and the Colonies but also all other countries. It also gives the requirements for registration of designs and trademarks and the appendixes of forms for every country, the authorities, size of drawings, etc.

POWER AND POWER TRANSMISSION. By E. W. Kerr, M. E. John Wiley & Sons, New York City. XII + 391 pages; 6 by 9 inches; 325 figures; cloth; \$2 net.

In the present edition, which is the third, the entire text has been reset and much of it rewritten.

The author of this work is professor of mechanical engineering at the Louisiana State University and has combined an extensive experience with his thorough mechanical training to produce a book that deals exhaustively with the subject of power.

It is divided into three parts: Machinery and Mechanics; Steam Power; Pumps, Gas Engines, Compressed Air Machines, etc.

The first part begins with a definition of terms, occupying 15 pages. Following this are chapters on shafting, bearings, friction wheels, pulleys, cams, pipe fittings, and so on. In each case the main considerations in the design of these members are stated and formulas for the calculation of strength are given.

The next section considers steam power plants in all their various forms together with the different units that go to make up a complete plant.

Part three is of the greatest interest to the automobile engineer as it gives a large amount of useful information concerning internal combustion engines. This section is divided into six chapters, one being on internal combustion engines, another on water-pumping machinery and a third on air machinery.

The chapter on gas engines discusses the method of transforming heat energy into work and then goes into the various cycles. Gas engine fuels and explosion temperatures are next considered. Then the various details of gas engine construction are described and the advantages and disadvantages of different designs brought out.

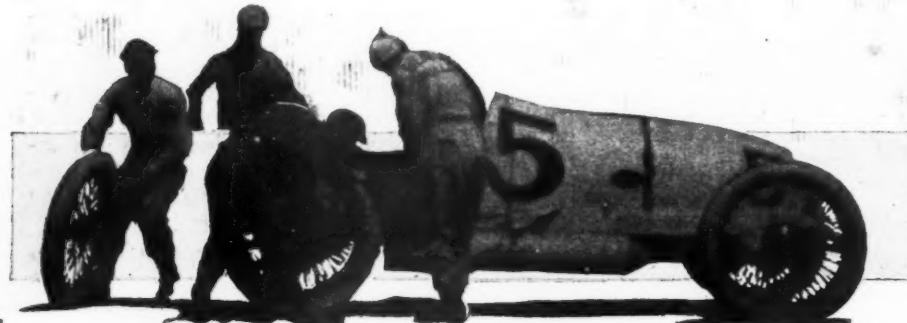
The chapters on pumping machinery and compressed air should also be of specific interest in so far as they relate to the pneumatic and hydraulic phases of car design.

MEXICAN FUEL OIL. The Anglo-American Petroleum Products Co., Ltd., 32 Broadway, New York City. 150 pages; illustrated; cloth.

Beginning with the growth of petroleum from the first well in 1859, down to the present time, the history of oil for power production is carefully traced. A comparison of the annual production of crude petroleum with that of coal is made and the principal uses of fuel oil together with its chemical composition discussed.

Following are chapters on the use of the oil in various branches of industry and in the appendix much data on the properties of oil are given.

Pit Efficiency Prize Won by Thomas



A typical scene at the pits. Wilcox and the Beaver Bullet

INTEREST in the work at the pits this year was centered about the efficiency prize offered by the Waltham Watch Co., to that one of the first three cars to finish that consumed the least amount of time at the pits. Thomas's Delage won this prize, in addition to most of the others, as the total time he spent at the pits was only 4 minutes, 55 seconds. He made three stops.

Thomas beat out Duray who had the three-liter Peugeot, in this efficiency race, by about a half a minute, the latter being held up at the pits for 5 minutes and 27 seconds. This time being divided up between three halts.

The Delage, toolled by Guyot, drew up at the pits but twice, but as one of the stops was for over 8 minutes it brought the total time out up to 9 minutes 15 seconds.

Barney Oldfield's Stutz made the best record of any of the cars to finish. He stopped only three times and lost only 3 minutes 36 seconds. Christiaen's Excelsior halted twice at the pits but lost 6 minutes 17 seconds in doing so.

By far the greatest number of pit stops among those to finish were due to blown-out tires. Thomas changed 5 tires during the race. Duray in the baby Peugeot changed an equal number. Guyot's Delage was a little more lucky, wearing out only two during the entire 500 miles. Oldfield changed but three and Christiaens four.

Thomas ran 140 miles before he made his first stop then he rolled into the pits and changed both rear tires, being held 1 1-2 minutes. An hour later, after he had run 215 miles he came in and changed a left rear, getting away in 50 seconds. His last stop during the race was at the end of the 350th mile when he stopped for a fresh supply of gasoline, water and oil, taking the opportunity at the same time to change both right tires. This held him 2 minutes 25 seconds at the pits. He ran the remaining 150 miles without a halt.

Duray Pulls in After 170 Miles

Duray did not find it necessary to stop until he had run 170 miles. After 2 hours of continuous circling of the brick track he halted to change the right rear and the right front tire and also to fill up the gasoline tank. This caused a delay of 2 minutes 6 seconds. An hour later he stopped for water but was away again in 23 seconds. Another 2 hours and he came in, for the last time, for gasoline and oil at the same time changed three tires.

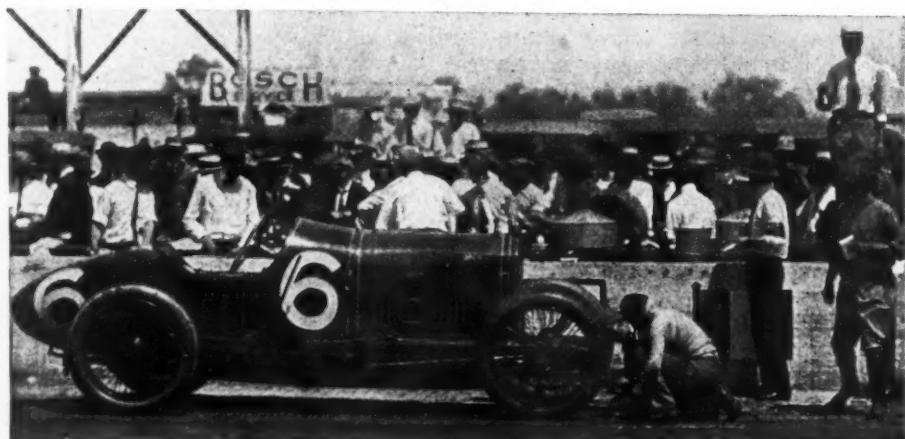
Winning Delage Stops Only 4 Minutes, 55 Seconds — Minimum Time Spent by Oldfield's Stutz, Losing 3 Minutes, 36 Seconds

The first of Guyot's stops came at 2 hours and 16 minutes after the start during which time he had covered 190 miles. He changed two tires and filled up his gasoline and oil tanks. The motor was hard to start and quite a little time was lost in getting under way after he was ready to go. Eight minutes 20 seconds elapsed before he was under way again. After completing his 376th mile Guyot halted for 55 seconds to take on gasoline. The remaining 125 miles of the race were completed without a halt.

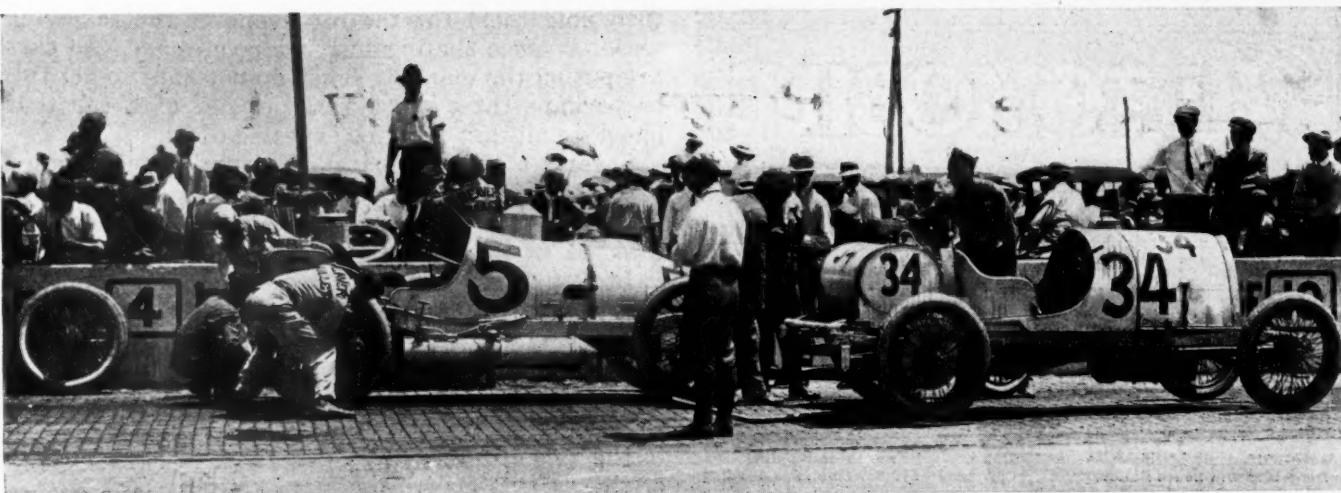
Goux Has Much Tire Trouble

Goux's Peugeot had a great deal of tire trouble. He made 10 stops in all and all but one of them were occasioned by tire changes. He put on 11 new tires during the 500 miles. His first trouble occurred only 11 minutes after the start when he had to change the right front wheel, but got away in 44 seconds. Twenty minutes later he was in again rolling down to the pits with the cords from the tread wrapped around the brake band. He changed both rear tires this time and was stopped for 1 minute 31 seconds. After this he ran a full hour without difficulties, but then came in for replacement on the right rear wheel. He filled up his gasoline tank at the same time, using up 2 precious minutes. Twenty minutes later the new tire blew out and he made the change this time in 29 seconds. This tire lasted 40 minutes, then it had to be changed, occasioning a stop of 1 minute. Thirty-eight minutes later he was in again. This time also he changed the right rear tire. He took occasion to refill his gasoline tank during this stop.

Instead of spring bolts at the front end of his forward



Goux and his Peugeot, finishing a quick tire change



Activity at the pits. At the left, the Beaver Bullet. At the right Friedrich's Bugatti

springs he had a tie-rod passing through both frame horns. This worked loose at one end and was almost dragging on the ground. He made only two laps after his last stop when he had to come in and replace this with bolts. This took up 4 minutes. Fifteen minutes later he was in again for 48 seconds to make another change on the right rear. This time he had better luck for he ran 1 hour 20 minutes without a halt and made up the most of the time lost during his previous frequent stops. His last stop was when he had only two more laps to go. This was occasioned by a bad tire on the front wheel and he made a record tire change in 30 seconds. This speed was appreciated by the grand stands as it was a critical moment.

Oldfield Stops After an Hour and a Half

Barney Oldfield ran an hour and a half before he had to make a stop for a new shoe at the same time he filled up his gasoline and oil tanks. He got away in 1 minute, 7 seconds. One hour 40 minutes later he halted again to change a right front tire and at the same time he took on oil and gas and gave up the wheel to Anderson. Anderson drove for 1 hour 10 minutes and then came into the pits for a new right rear tire, and gasoline and oil. Oldfield took the wheel and the car was under way in 49 seconds running steadily to the finish. Two of his Firestones lasted the full distance.

Two Long Stops Made by Christiaens

Christiaens' two stops were both of greater duration than the average. He did not halt in the steady grind around the brick oval until he had traveled 3 hours and had covered 240

miles. He changed both rear tires and one front one and took on gasoline and oil. He did not get away until 4 minutes 39 seconds had elapsed. An hour and 45 minutes later Christiaens pulled up at the pits seemingly more for a rest than for any other reason. He seemed completely exhausted and fell out of the car. He stayed at the pits for 1 minute 15 seconds while his gasoline tank was being filled. A moment's rest seemed to do wonders for him as he took the wheel briskly and finished the remaining 125 miles in good condition. Harry Grant stopped his Sunbeam 5 times during which he lost a total of 9 minutes 27 seconds. He changed 6 tires and took on gasoline once. He ran only 36 minutes before coming into the pit for 1 minute 50 seconds to change a right front. Twenty-four minutes later he was in again to change both right tires halting for 1 minute 56 seconds. He then continued steadily for 1 hour 6 minutes without a halt when he stopped to change a right rear tire and also take on gasoline. This caused a wait of 3 minutes 20 seconds. After this he ran for 2 hours 15 minutes without a halt when a left front tire caused a stop at the pits for 4 minutes 45 seconds. Thirty minutes later he was in again to change the right rear tire and was on the way in 1 minute 47 seconds.

Beaver Bullet Consumes Tires

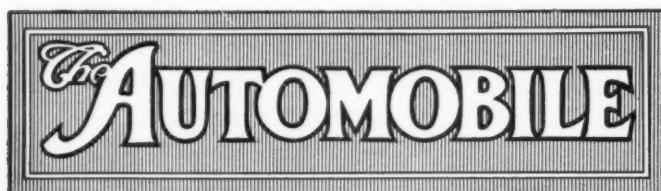
Keene's Beaver Bullet had more than its share of tire trouble. The car made 12 stops at the pits and lost 23 minutes and 28 seconds. Thirteen tires were changed by Keene during the 500 miles and seven of these were on the

(Continued on page 1194)

EQUIPMENT USED ON LEADING CARS IN INDIANAPOLIS SPEEDWAY RACE

No.	Driver and Car	Carburetor	Magneto	Plugs	Wheels	Shock Absorbers	Tires
16	Thomas, Delage	Claudel	2 Bosch	Eyquem	R. W.	T-Hartford	Cord
14	Duray, Peugeot	Claudel	Mea	Bosch	R. W.	T-Hartford	Cord
10	Guyot, Delage	Claudel	2 Bosch	Bosch	R. W.	T-Hartford	Cord
6	Goux, Peugeot	Zenith	Bosch	Oleo	R. W.	T-Hartford	Cord
3	Oldfield, Stutz	Schebler	Bosch	Bosch	Wood	T-Hartford	Firestone
9	Christiaens, Excelsior	2 Claudel	Bosch	Bosch	Adex	T-Hartford	Cord
27	Grant, Sunbeam	Schebler	Bosch	Bosch	Steel	T-Hartford	Cord
5	Wilcox, Beaver Bullet	Rayfield	Bosch	Bosch	Dunlop	T-Hartford	Dayton, Miller Nassau
25	Carlson, Maxwell	Harroun	Bosch	Bosch	Houk	Hartford	All makes
42	Rickenbacher, Duesenberg	Schebler	Bosch	Bosch	R. W.	T-Hartford	Michelin
23	Mulford, Mercedes	Rayfield	Bosch	Bosch	Dunlop	Mercedes	Braender
43	Haupt, Duesenberg	Schebler	Bosch	*	Wood	T-Hartford	Riverside, Nassau, Michelin
31	Burman, Keeton and Knipper	Rayfield	Remy	Bosch	Houk	T-Hartford	Nassau

*Champion and Bosch.



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Europe's Victory

SATURDAY'S race on the Indianapolis speedway brought forcibly to mind the early contests for the Vanderbilt cup, when Europe romped off with all the premier honors and America was content to finish cars in tail-end positions. With the single exception of the Stutz, which took fifth place on Saturday, America had nothing to show but the last three positions.

Unfortunately Saturday's race cannot be looked upon as a favorable advertisement to the American car, largely due to the fact that the American representation was small, and in only three or four cases was a product of the representative class of American construction. It nevertheless stands as a fact circulated to the four corners of the world, that Europe took six out of the first seven positions, and the best that America could get was fifth place. We congratulate Europe on its well-earned victory.

Too many American entries rested on old models, cars worthy of any foeman, but cars which already had borne the heat and brunt of the fray and went into Saturday's race handicapped physically, not the best representation of what American makers can produce. Racing experience has almost indisputably established the fact that two big races are about all that any racing car will endure. France discovered this 2 years ago, and her leading exponents of racing cars follow this program closely. They bring their cars out in the autumn and give them their preliminary test in some of the shorter races, and

then hold them for the big event of the following season. Once the big test has been made, the cars are put on the market. They do not hope to get two or perhaps three more victories out of a car that has done all that could be expected of it.

Several of the American cars undoubtedly failed because they had been raced once too often. They behaved perfectly in practice, they went through the first half of the race perfectly, but they went out due to broken parts, parts that were up to par when the cars had been built, but parts which had played their role, done their duty and should have been replaced.

Experience has proven that steering knuckles, even if made of the best material, will endure only so long, on speedway work. This discovery led to the rule enforced this year of requiring a change of these parts before the start of the race.

Reasoning from this, the shrewd follower of speed contests can go further, as a result of experience gained on Saturday. There are many other parts that become fatigued because of the long, hard service of racing. Timing gears, though made of the best material, will give out. Crankshafts will give way, bearings are not immune, even frames of alloy steel do not always withstand the grueling of excessive vibration. The lesson for all is that the future race winner will sell his car after it has made good once or twice, rather than meet with humiliating failure by entering once too often in a severe test.

The High-Efficiency Motor

THE most conspicuous factor in Saturday's speedway race was the little Peugeot with 183 cubic inches piston displacement finishing in second place, and only 3 minutes behind the leader that averaged 82.47 miles per hour for the 500 miles. Last week we drew attention in these columns to the phenomenal speed of 90 miles per hour made for one lap by this little car in the qualifying trials and now the running of the race but adds another chapter to the small, high-speed, high-efficiency motor, namely, that it is capable of going the distance without a single instance of mechanical troubles of any nature and that it is capable of higher sustained speeds than the other twelve cars that finished, with the exception of the winner.

This little car is owned by a private citizen in Paris. He uses it as a road car and loaned it to the driver for this race. The driver overhauled it himself, and with his own hands forged the additional parts needed for the steering gear. He overhauled it in his garage in France and did not even dismantle the motor in this country. From the driver's point of view, the small, high-speed, high-efficiency motor is not an impossibility, but a very easily handled job, a car not any more difficult to tune up than the larger cars we have been using.

The story of the small car is one of having all parts entering into the car up to a high standard. Turning pistons from solid bars of the best steel is not enough, but these pistons must have every gram of unnecessary weight cut out of them, they must have the proper clearances and must be carefully balanced. The crankshaft must be perfectly made.

In fact, it is in two parts in order to use a ball bearing in the center, as well as one at each end. Every effort is made to reduce friction of parts. The connecting-rods are in proportionate strength with the crankshaft, with the pistons and with the motor in general. Not a single iota in the chain of parts from the motor to the rear wheels has been overlooked. Every part has been proportioned to the power, the weight and the speed of the car. The valves are not abnormally large; they have nothing abnormal in their lift; the timing is not extreme. It is just a good, well-built, average car. Each part bears its proper relationship to the completed whole. It is not getting speed by large valves and leaving the other parts too weak to withstand the higher pressures that are consequent upon the greater power coming from the larger valves. The small, high-efficiency motor is a scientific design, not a guess-work creation.

500 Miles in 1915

THREE will be new rules governing the 500-mile race to be held at Indianapolis in 1915, or at least there should be some new regulations, and as the speedway has always been a leader in the adoption of up-to-date rules, it is accepted that regulations as a result of Saturday's race will be adopted.

The smoke was one of the greatest nuisances Saturday, the majority of the American cars emitting smoke in large quantities through the exhaust, whereas practically all of the foreign machines covered the entire distance without emitting a single cloud, and very rarely was the slightest puff of smoke witnessed. Improvements in lubricating systems have made it possible to practically eliminate the smoke. Smoke on the speedway is dangerous, particularly in the early laps of the race when the thirty cars are running, and chiefly so when they are congested on the turns. It will improve car construction to make it obligatory that a car travel without smoke. Make such a regulation as imperative as speed qualifications.

Next year will without doubt see the piston displacement reduced to 350 cubic inches or perhaps 300. Everything points to a lower limit at present. In Saturday's race a car with 380 cubic inches finished first, one with 183 cubic inches finished second, and one with 380 cubic inches finished third. Cars with motors this size gave all that was expected, and more, in the matter of speed. In fact there were very few of the 450-inch or thereabout motors that completed the race.

Still a further reason for reducing the piston displacement is found in the fact that this year the Grand Prix race to be run in France on July 4 will be for motors with 274 cubic inches. The motors of this size have been on the roads for 6 months, not a few of them have participated in short preliminary races, and prospects are that these small motors will show considerably higher speeds than the larger motors of a year ago. But France is going further and in her other road races is limiting the motor sizes to 151 cubic inches, whereas last year these races were for 183-cubic inch sizes. All of these

factors point to a smaller motor limit for the speedway classic of next season.

With the smaller motors it is imperative that American makers get their cars out 6 or 8 months in advance, to give them plenty of road work and to have them ready for the race 2 months in advance instead of 2 weeks or 2 days. The small high-efficiency motor is a new factor with many American companies and they cannot hope to succeed in the first trials, particularly if everything is left until the last moment.

Cord Tires in Races

THE cord tire played a greater part in the speedway race last Saturday than was expected by many, in fact, it was the first occasion in which the cord tire had a real test in speedway races, and these tires, which cost considerably more than the woven-fabric ones, promise to receive much greater attention in racing a year hence.

To the driver the cord tire is a safer racing tire than the fabric one because it rarely blows out, there being a colored strip in the tread which shows itself and gives a warning to the driver that there remains but so many additional miles of use. As a result there were fewer blowouts Saturday than in previous races, although the cord tire was not entirely immune, at least, some makes of it were not. There were cord tires made in France, cord tires made in England, and cord tires made by a couple of the large tire companies in America. Of these the French makes seemed to give greatest trouble, for reasons unknown at this time, and the Peugeot team attributes its defeat to defects in these tires. On the other hand other winners attribute their victories partially to the use of the cord tire.

The cord tires used were generally of larger diameter than fabric ones, rears of 6 inches diameter, and carrying but 70 pounds pressure. There was one make of American tire using but 40 pounds pressure. These lower pressures in themselves are desirable factors and that the large-diameter tire of cord construction does not reduce speed but actually adds to it, is one of the foremost reasons why the cord tire will become more prominent within the next year.

Within the past 6 months the cord tire has demonstrated its value in fuel economy contests, several concerns proving that it is possible to get considerably greater mileage per gallon of fuel with cord tires than with fabric types. The economy of the cord tire has also been demonstrated in the use of electric vehicles, it being possible to measure with electric instruments the economy in current when using the cord tire as compared with using the fabric tire. As economy is becoming more and more an important factor with the car buyer it is but natural to look for an increase in use of the cord tire in spite of its greater original cost. Up to the present manufacturing difficulties have stood prominently in the path of cord tire development, but these are being eliminated and history will very nearly record the fact that 1914 will be the first really good year for cord tires in America.

Strong Trade Boom Found by Reeves

Biggest Spring Business Ever— Smaller Motors a Speedway Result

NEW YORK CITY, June 2.—Upon his return from a trip through Michigan and Indiana, completing visits to seventy-four automobile makers holding membership in the National Automobile Chamber of Commerce, Alfred Reeves, general manager, says that with the improvement in weather conditions, the makers are enjoying the best spring trade in their history.

March and April were record months in production and shipment of cars and with the good weather of the last few weeks, the dealers are getting the cars into the hands of their consumers at a record pace and sending additional orders to the plants. Most of the makers will complete their shipments of 1914 cars by July 1, and some makers are even now out of cars.

Mr. Reeves, who attended the 500-mile race at Indianapolis, says the foreigners won because of exceedingly careful preparation, the foreign makers having always made more of a business of racing than the American car producers.

"There were more than 100,000 people at the race," said Mr. Reeves yesterday, "making for great enthusiasm for motoring in general. Many of the big manufacturers who attended appreciate the impetus that a big contest of that kind gives to the general trade."

Big Impetus to Racing

"With talk of a couple of other speedways being erected in this country, American manufacturers may decide to go after laurels in speed contests and tours, just as the French are doing on the other side in an effort to increase the appreciation of speed and reliability in their cars."

"Motors much smaller in cylinder displacement will be used for next year's race. Where formerly a speed of 100 miles an hour could be obtained only by giant racers the cars at Indianapolis traveled laps at the rate of 85 to 100 miles an hour, before they could even qualify for the finals, and yet the cylinders were limited to 450-inch displacement, which means about 4-inch bore and 7-inch stroke. No better proof of the advance that has been made in motor car construction could be offered than the speed supplied by these small motors. For example, the winning car had a cylinder of a little more than 4-inch bore with a 7-inch stroke, while the second car had a bore of only 3 inches, with a stroke of 6-1-10."

To Test Headlights in New York City

NEW YORK CITY, June 2.—For the purpose of determining what constitutes a dazzling headlight and to test various devices for overcoming the glare and blinding effect produced by the intense lights of automobiles, especially since the introduction of electric headlights of high candle power, the Safety First Society has arranged for a demonstration to be held Friday evening, June 5, which will be witnessed by several state and city officials.

The arrangements are in charge of Chairman A. B. Cumner and the other members of the automobile technical sub-committee, consisting of David Beecroft, A. J. Slade, Joseph Tracy and G. H. Robertson, Secretary of State Mitchell May, Chief City Magistrate William McAdoo and other officials will see the test.

The test will be made at 140th street and St. Nicholas avenue at 9 p. m. At present six entries have been made. These are the Ward Leonard Electric Co., with the No-Daz headlight dimmer; the Johns-Manville with the J.-M. Lens; the Corning Glass Works with the Noglare dimmer; the Vesta Co., the Federal Equipment Co., with the Dim-E-Lec dimmer and the Legalight Mfg. Co., with the Legalight reflector.

Against Hasty Truck Standardization

NEW YORK CITY, May 30.—At a meeting of the commercial vehicle committee of the National Automobile Chamber of Commerce held last week, the standardization of truck design and the danger of proceeding too fast in this direction at the

present time were the two main topics. Standardization of equipment along proper lines, it was agreed, is both desirable and feasible.

The possibility of bringing about a clearer recognition of what constitutes reasonable and equitable service in looking after trucks sold to users, was another topic considered. The committee agreed that the chief need is to bring about a more general and closer adherence to the terms of the standard warranty and that owing to difference in conditions and practices it seems impracticable to do more than define broadly what constitutes service. The adoption of such a definition, however, was left for some time in the near future when a convention of commercial vehicle makers may be called at which the views of many manufacturers on the subject can be obtained. The meeting was attended by W. T. White, president of the White Co., chairman; H. Kerr Thomas, assistant manager of the Pierce-Arrow M. C. Co., and M. J. Budlong, president of the Packard M. C. Co., this city.

Packard Makes Changes in Tire Prices

NEW YORK CITY, June 1.—The Packard M. C. Co. of New York, has issued a new tire price list, effective May 25. The company has an accessory department which carries a complete line of accessories. Many of these the company is able to offer in combinations at prices which net the customer a saving of from 25 to 40 per cent. In its new tire list certain prices have gone up, such as the Ajax, the plain tread and the non-skid types of which have gone up approximately \$2, with a guarantee in writing by the manufacturers for 5,000 miles. The Batavia tires have had a similar rise in prices, with adjustments on a 4,000 mile basis. The Diamond, Firestone, Goodrich and Goodyear prices, both plain and safety tread, remain unchanged. Fisk prices have gone up approximately \$2, while those of the Kelly-Springfield rose approximately \$4. The Republic tires have been boosted about \$1, while the Swinehart are \$3 higher. The Nobby Tread type of the U. S. Tire Co. have been reduced over \$3, while the other types remain unchanged.

A Prest-O-Lite Plan To Recall Its Tanks

NEW YORK CITY, June 2.—A plan to recall all its gas tanks has been devised by the Prest-O-Lite Co. Following up the advantage given it by the opinion of the United States Circuit Court of Appeals in its suit against the Searchlight Co., it hopes to get all of its own tanks back into its own service system and feels that it can keep them there now by reason of the court's ruling. This ruling was that a refilling company cannot use a Prest-O-Lite tank unless the Prest-O-Lite name and label have been obliterated. The company has sent out letters to dealers in which it threatens suits if tanks are refilled and sold as Prest-O-Lite tanks. Before the decision refillers had been permitted to paste paper labels over the Prest-O-Lite mark.

A plan adopted by the company to get back its tanks is as follows: A two-piece receipt tag has been issued; one is a receipt from the company to the customer for "an acetylene cylinder of another lighting system which was substituted on him by the exchange agent named in the stub of this coupon"; the Prest-O-Lite Co. at its own expense is authorized by the customer to get his original Prest-O-Lite tank back for him. The other end of the tag is a receipt by the customer to the Prest-O-Lite Co. for a tank "on loan until I recover the Prest-O-Lite cylinder which was fraudulently taken from me.....by.....". The company states that it will then proceed against the substituting dealer in the U. S. courts.

The company offers to accept from dealers tanks which have been mutilated by refilers and to charge for nothing except excessive repairs made necessary by the mutilation.

Reo Assets \$1,457,163

NEW YORK CITY, May 31.—The balance sheet of the Reo Motor Co., May 16, 1914, shows: cash on hand, \$937,381; receivable, \$1,157,772, and payable \$637,190. The net current assets were \$1,457,963.

Wooster Abandons Building Palmer-Singer

NEW YORK CITY, June 2.—William Wooster has decided to abandon the building of Palmer-Singer cars costing \$450. Mr. Wooster will auction off at 10 o'clock on June 8 the whole of his recent purchase in lots and not in one parcel. He recently purchased the machinery and most of the stock and parts at the bankruptcy sale of the Palmer & Singer Mfg. Co., Long Island City, and stated that he had plans to enter the car manufacturing business, building a small car with a Continental motor and other standard parts at the above

price. The name Palmer & Singer was included in his purchase.

He has paid between \$16,000 and \$17,000 for a majority of the parts, stock, materials, equipment, office furniture, good-will, name and the service department. The service department will be sold in one lot, valued at \$50,000. He has no prospective purchaser in view and states that he is able to make no prediction as to the future of the Palmer-Singer name and car.

Electric Vehicle Division Appoints Committees

NEW YORK CITY, June 2.—At a meeting of the Electric Vehicle Division of the Society of Automobile Engineers held at the headquarters of the society, the division was divided into five sections and five sub-committees were appointed. While no definite titles have as yet been adopted, the various committees will probably have definite fields set aside for their work. One committee will doubtless cover motors and controllers; another will study batteries, wiring and charging; a third will have jurisdiction over the lamps; a fourth will consider tires, especially in regard to their efficiency for electric vehicle work, and the fifth will have the field of speed and mileage ratings to cover.

Wisconsin Honors for Inventor Carhart

MADISON, WIS., June 1.—John S. Donald, secretary of state of Wisconsin, and interested in motor cars by reason of being the administrative officer of the law requiring the registration of motor cars, has started a movement to honor publicly Dr. J. W. Carhart, a Presbyterian minister who resided at Racine, Wis., for many years, and who built and operated the first motor-propelled vehicle in America as far back as 1876. Dr. Carhart is now a resident of San Antonio, Tex. It is planned to ask the legislature to appropriate funds for a medal and a purse of several thousand dollars in recognition of Dr. Carhart's contribution to humanity. The first vehicle was a buggy to which Dr. Carhart applied a steam engine. The car carried a large boiler. It was recently described and illustrated.

To Trace Stolen Cars in N. Y. State

NEW YORK CITY, June 1.—The New York State Automobile Association is completing the organization of a protective bureau, the purpose of which shall be the prevention of automobile thefts and the recovery of stolen cars. This bureau has been instituted because of the alarming frequency of automobile thefts.

According to the plans which have already been formulated, the members of the affiliated clubs of the organization have been requested to telegraph a full description of their cars to the headquarters of the association in this city the moment he learns of its disappearance. Thus far it has been determined that the state association will have a fixed reward the individual or club may offer for the recovery of the stolen car and the arrest and conviction of the thief.

Right To Sell Tires Anywhere Upheld

NEWARK, N. J., June 2.—Vice-Chancellor Howell refused today to grant an order enjoining Walter Murray, a former salesman for a tire company of 25 William street, New York City, from selling automobile supplies anywhere in the state.

It seems Murray entered into an agreement with the company, and on the strength of this the company tried to restrain him from selling automobile tires and supplies in this state. Murray alleged that the contract provided that it could be terminated by either party on 30 days' notice. The Vice-Chancellor held that a man should be allowed to gain a livelihood in the manner for which he is best fitted.

Gasoline Drops 1 Cent

NEW YORK CITY, June 3—Gasoline dropped 1 cent, yesterday, from 16 to 15 cents a gallon wholesale to garages in this city. This drop was made in two sections, first in Brooklyn and Long Island, and yesterday in Manhattan, the Bronx and Richmond. These changes apply to the Standard Oil Co. Over in New Jersey, gasoline sold by the Texas Co., called Texaco, is being sold for 14 cents a gallon, retail. The American Gasoline Co., the Shell Spirits representative in the Bear State, is credited with the statement that it very likely will meet any reductions by other companies.

Wilson May Ask Highway Change

Considering Request to Highway Assn. To Include Washington

WASHINGTON, D. C., June 1—President Wilson probably will indorse the movement to have the route of the proposed Lincoln highway pass through Washington. Impressed by arguments put up to him today by a joint delegation of business men from this city and Baltimore, he instructed his visitors, at the close of his talk with them, to prepare a letter to the Lincoln Highway Assn., which he might decide to sign, asking that the route be changed so as to include Washington.

As the proposed highway is a private enterprise the government has no direct influence over the selection of the route. The delegation urged that the route be diverted so as to run from Philadelphia, through Wilmington, Baltimore and Washington, and thence by way of the Ridgeville road to Frederick, Md., and thence to Gettysburg, where the main route would be picked up.

It was pointed out to the President that no actual construction would be needed in making the change of route, inasmuch as the road commissions of Pennsylvania, Delaware and Maryland have practically completed a new and continuous highway passing through all points on the newly suggested route. All that would be required would be for the Lincoln Highway Assn. to designate these roads as portions of the memorial roadway.

New Home for Carter Carbureter

CHICAGO, June 1.—The Carter Carbureter Co., St. Louis, Mo., whose present factory is located at 912-914 North Market street, that city, has just bought the large modern factory located on Spring avenue, between St. Louis and Dodier avenues, formerly occupied by the Carruthers-Jones Shoe Co. The main building is of brick, three stories, 125 by 50 feet, and another building 40 by 90 feet will be put up at once, with additional buildings as needed, the purchase including ample space for expansion. The Carter company expects to move to the new plant about July 1.

The expansion of the business of the Carter company, as indicated by the acquisition of the new plant, is significant of the progress made within the past year, since selling arrangements were made with the H. W. Johns-Manville Co. to sell the entire product of the Carter company. It is stated that the factory has been unable for some time past to keep the production up to the demand, and thus the necessity for better manufacturing facilities was imperative. In the new location, the Carter company expects to treble its daily output.

Florida Co. To Manufacture Fire Trucks

TAMPA, FLA., May 29.—The Haney Rescue Apparatus Co., this city, has been incorporated with a capital of \$2,000,000 to build the Haney fire and rescue apparatus and motor trucks for the conveyance of the apparatus. The truck has a loading space of 12 feet in length, being ample for the apparatus and six firemen. It is equipped with a six-cylinder 45-horsepower engine of the modern type and can attain a speed of 40 miles per hour.

E. H. Haney is president; T. M. Wier, first vice-president; F. M. Williams, second vice-president; R. C. Stubbins, treasurer, and Samuel Borchardt, secretary and general counsel. Messrs. Haney, Borchardt, Stubbins and Binford constitute the executive committee.

NEW YORK CITY, May 29.—H. B. Joy, of Detroit, Mich., has been elected to the board of directors of the Chamber of Commerce of the United States.

NEWARK, N. J., May 28.—W. Crighton Harris has resigned from the engineering firm of Crighton Harris & Co. to become chief engineer of the Titan Storage Battery Co., Newark, N. J.

American Cars Most Popular in Canada—7,200 Sold in 1913

Last Year's Trade Aggregating
\$9,233,561 Against \$700,504
in 1908 Was 4-5 of Import

TORONTO, ONT., May 30—Canada imported 7,200 motor cars from the United States in 1913, the total value of which was \$9,233,561. Five years ago, in 1908, Canada bought only 385 cars worth \$700,504 from American makers. There are today from forty to fifty thousand cars in use throughout the Dominion with an average price between \$1,500 and \$1,600. This takes into account the many assembled in Canadian branch factories and therefore not included in customs returns. Cars of Canadian manufacture average above \$2,000 each. British makes form a negligible total in the Canadian trade, probably not more than 2 per cent. against United States sales of between 70 and 80 per cent. The small demand for the British car is due partly to lack of aggressive selling methods but also to the low clearance which is not satisfactory on Canadian roads.

Wisconsin Permits to Date, 42,000

MILWAUKEE, WIS., June 1—Forty-two thousand privately owned motor cars, the largest number ever existing in Wisconsin, are now registered in the office of the secretary of state of Wisconsin. On May 25 the total 1914 registration passed the 40,000 mark and on May 30 the number had been increased by 2,000. The 1913 registration was 34,646 and there is now no doubt that the 1914 registration will exceed that of last year by at least 10,000 before the end of the year. The average value of these cars is \$1,200, according to figures compiled by the secretary of state. In addition to the 42,000 private car registrations, there are 1,132 dealers licensed in Wisconsin and 6,135 motorcycles. The private car registration fee is \$5 per year; that of dealers, \$10, and for motorcycles, \$2. After the expenses of administration are paid, the balance is turned into the state highway fund, 75 per cent. going into the highway fund of the county of origin, and 25 per cent. into the state highway fund.

Pennsylvania Licenses Reach 100,000

HARRISBURG, PA., May 29—All records for automobile licenses issued in the state of Pennsylvania were smashed this week when the number reached 100,000. Last year only 131,204 licenses of all kinds were issued. This year with 5 months passed, more than 137,000 have been issued. The total amount of money received is \$982,323 as compared with \$841,000 last year.

Ohio Issues 95,500 Automobile Licenses

COLUMBUS, O., May 29—The Ohio automobile department has issued licenses to the number of 95,500 since the first of the year up to May 28. It is estimated by registrar Shearer that the number will total 115,000 during the current year. Motorcycle licenses to the number of 16,000 have been issued.

Ohio Municipalities Cannot Enact Smoke Ordinances

AKRON, OHIO, June 1.—Judge William J. Ahern, Jr., of Akron, has made a decision in which it is held that a municipality in Ohio has not the right to enact an ordinance prohibiting smoke to issue from the exhaust pipe of automobiles. The decision was given in the case of J. Harry Weiner, charged with the violation of the ordinance.

Cars of Light Horsepower Popular in N. Y.

NEW YORK CITY, May 28—Secretary of State May has sent out a report indicating the increase of automobile registrations shown by 1914 over 1913 and 1912. This is the period between February 1 and April 30, inclusive. The report shows that the market for the cars of high horsepower is not as good as it was, and that the tendency is toward a car of around 35 horsepower. The figures are:

Year	Under 25 hp.	25-35 hp.	35-50 hp.	Over 50 hp.
1912.....	31,640	28,888	13,375	1,261
1913.....	36,316	33,296	13,702	1,151
1914.....	45,575	36,974	15,226	1,056

The year 1913 shows a 13 per cent. gain over 1912 and

1914, an 18 per cent. increase over 1913. The increase is greatest in the under 25 horsepower class, where the 1914 percentage is 25 per cent. higher than the total of 1913. The class between 25 and 35 horsepower shows an 11 per cent. gain, as does the 35-50 horsepower division. There is a loss of 9 per cent. in the last division.

Tractors Now Licensed in Pennsylvania

HARRISBURGH, PA., May 29.—State High Commissioner E. M. Bigelow has suspended for the present the rule governing the operation of tractors. These vehicles of over 100 inches in width and used for agricultural purpose may now be registered at the state highway department. At the highway department there is a sentiment in favor of amending the law so as to make a distinction between tractors used for farming purposes and the big machines for hauling freight, stone and other heavy materials.

A State Liable to All Its Employes

TRENTON, N. J., May 28.—Assistant Attorney-General Boggs, in an opinion to Commissioner of Motor Vehicles Lippincott today, said a chauffeur injured while operating a State automobile might have a claim against the State under the employers' liability act.

"Every employee of the State seems to come within the provisions of the workmen's compensation law," said the assistant attorney-general, "and it might be well in insurance policies to include the liability of the State for accidents to its own employes."

10,000 Privately Owned Tags in Virginia

RICHMOND, VA., May 31—Virginia now has more automobiles within her confines than ever before in her history, 10,100 licenses for motor cars, exclusive of the special license granted to automobile dealers, having been issued up to last night. Throughout the state 148 dealers have been issued license tags which are used on more than that number of cars. During 1913 there were a total of 9,022 licenses issued, and judging from past experiences it is safe to predict that at least 2,000 more licenses will be issued before the end of 1914, bringing the grand total to 12,100.

Kelly-Springfield Tire Plan Upheld

NEW YORK CITY, June 2—The suit brought against the Kelly-Springfield Tire Co., by A. M. Polack, a New York broker, to restrain the company from retiring debenture bonds with preferred stock, refunding back dividends with second preferred shares and making second preferred convertible into common, was disapproved yesterday in a decision handed down by W. C. Noyes, referee, formerly Justice of the U. S. Circuit Court. The expediency and wisdom of the plan being upheld, the company will now proceed to carry it out. Almost all of the bondholders have deposited their bonds for retirement.

Under the stipulation entered into between the parties, the judgment directed by Judge Noyes becomes final without appeal.

No Tax Escape in Iowa

DES MOINES, IA., May 31—Iowa automobile owners whose cars have escaped payment of state license fees in other years must pay the back taxes even if their cars were owned by other persons prior to this year. Such is the ruling this week of the state automobile department under the supervision of W. S. Allen, secretary of state. Litigation is sure to result as many owners promise to bring test cases. It has been found that in many cases where fees are tendered for 1914 auto number plates there was no fee paid in 1913 and in some cases in 1912, yet the record may show that the cars were in service during those years. This means that the local authorities in Iowa have in some cases permitted the operation of cars during a period of at least one whole year without registration. New numbers are being refused until back taxes are paid. In cases where cars now are in the hands of third persons under purchase, present owners are objecting strenuously and threatening to begin suit to test the right of state officials to require payment of the back fees. The state is standing pat.

Sieze Cars Encumbering N. Y. Streets

NEW YORK CITY, June 3—Acting on orders from Street Cleaning Commissioner Fetherston to clear the streets of automobiles left unattended, employees of the Department of

Street Cleaning yesterday seized an automobile at Forty-ninth street and Eighth avenue and took it to the yard for storing encumbrances at Twelfth avenue and Fifty-sixth street.

Commissioner Fetherston explained that it was not his intention to seize automobiles left standing at the curb outside of private residences. "What we are after," he said, "are the chronic offenders—garage owners and automobile dealers—who in many instances use the street continuously. A great many of these offenders are located on the upper West Side."

Employers Asked to Prepare for Compensation Law

NEW YORK CITY, June 2—A circular signed by R. E. Dowling, chairman of the State Workmen's Compensation Commission, has been sent out to the manufacturers calling attention to the new law, which goes into effect July 1. They are asked to make preparation for complying with it.

Three courses are open to them. They may insure employees in the State Compensation Fund; may insure them in any stock corporation or mutual association authorized to transact such business in this State, or may give the commission proof of their financial ability and deposit securities to the amount the commission may demand. The commission points out that it may charge only the lowest possible premium in the State fund, and that if there should be any surplus, it is authorized to distribute it among employers doing business with the fund, provided that the amount of compensation paid to the employees of any manufacturer is not in excess of the premiums he has paid to cover them.

To facilitate its work, the commission has called upon each employer to fill blanks giving all information needed. Such information is to be treated as confidential.

Cannot Restrict Agent's Territory in Texas

DALLAS, TEX., May 31—An important decision affecting automobile sales agencies in Texas has been handed down in the Federal Court at Dallas by Judge Meek in the case of the Cole Motor Car Co., of Indianapolis, versus Charles F. Hurst and others. Hurst had the agency for cars manufactured by the Cole Motor Car Co., which attempted to restrict his territory. The court held that such restriction was in violation of the Texas anti-trust law. Hurst and his guarantor were sued by the company to recover certain sums alleged to be due the company for the sale of cars. The verdict was given for the defendant.

Klaxon Prosecutes New Patent Actions

NEW YORK, May 29.—Following up its recent successes in getting final decrees in the Southern District of New York against the Jackson, Haynes and Garland companies, and the preliminary injunction against the A. Elliott Ranney Co., eastern distributor of the Hudson cars, for infringement of the basic Klaxon patents by using Sparton horns as automobile equipment, the Lovell-McConnell Mfg. Co. has been active in its suits in Detroit against the Sparks-Withington Co. and the Hudson Motor Car Co. The latter cases are pending before Judge Tuttle of the United States Court for the Eastern District of Michigan. On May 25, he stated that while he felt constrained to postpone consideration of plaintiff's motions for preliminary injunctions pending decision on



Alma truck—a store that has 500 customers

the Newtone appeal in the Second Circuit, the latter would doubtless be decided soon so that there would still be ample time for him to hear and decide these Sparton cases before the summer vacation.

Hearing on Compensation June 5

ALBANY, N. Y., June 3—Governor Glynn has called a hearing for 2 p. m., Friday, June 5, at the Executive Chamber in the capitol at Albany for the purpose of discussing rates of insurance under the workmen's compensation law, which goes into effect July 1. The hearing will be attended by many prominent liability underwriters, some of the members of the workmen's compensation commission and officials of the Insurance Department.

Drawbacks Granted to Jesco and Healy

WASHINGTON, D. C., June 2—A drawback allowance was today granted by the Treasury Department on the exportation of automatic electric starting and lighting apparatus designated as Jesco, manufactured by the Jones Electric Starter Co., of Chicago, Ill., with the use of imported carbon and metal brushes and ball bearings. Other drawback allowances granted were as follows:

On automobiles manufactured by Healy & Co., of New York, with the use of imported chassis and domestic bodies manufactured with the use of imported materials.

Colorado to Gulf Sociability Run Finished

COLORADO SPRINGS, COL., May 28.—Bringing to a successful close the Colorado to the Gulf sociability run and marking the completion of one of the longest tours of this character in the interests of good roads, the members of the party returned today to their home cities, Colorado Springs, Pueblo and Manitou, after a 2,500 miles tour through Texas, Oklahoma and Kansas extending over a period of three weeks. Road conditions, on the whole, were found to be good.

Parsons Patent Pleas Argued

HARTFORD, CONN., May 30.—Judge Edwin S. Thomas in the United States Court this week heard the plaintiff's motion for a permanent injunction in the patent suit of the Parsons Non-Skid Co., Ltd., and the Weed Tire Chain Grip Co. against the Smith & Egge Mfg. Co., and the Walker Tire Chain Co. The complainants are of London, England, and New York and the defendants are of Bridgeport. There was no personal appearance for the defendants but affidavits on the part of the defendants were filed in opposition to the motion. Judge Thomas reserved decision.

Motor Transport Line Across the Andes

NEW YORK CITY, May 30—An automobile transport line has been established between Los Andes and the City of Mendoza. Wiedgan & C'ia of Valparaiso are the projectors of this scheme. The tariff proposed is one-half that charged by the Trans-Andean Railway. The principal articles of transport for which a profitable business is anticipated will be wood, barrels in sections, hogshead staves, sulphur, cement, galvanized iron, conserved fruits, etc. Garages will be installed along the road containing spare motor vans and all repairs and accessories. Roads are put into condition so as to allow the automobile to carry twelve or more passengers and trailers, 17,600 pounds of merchandise. It would be possible then to charge freights of about \$3.70 per ton, instead of \$7.40 charged by the Trans-Andean Co.

Here's a Store on Wheels

DETROIT, MICH., May 29.—The motor store is the most recent novel venture in the merchandising world. It has been started by E. R. Eriksen, of Greenville, Mich., who had a truck built for him by the Alma Motor Truck Co., of Alma, Mich., manufacturers of the Republic trucks. Upon one of these trucks there has been built a specially designed body which is fitted with shelving and all the accessories of an up-to-date store. The motor store which carries a complete line of general merchandise makes each day a round trip of 50 miles and about 500 homes are served every week. Although a little pessimistic at first as to the success of his new venture, Mr. Eriksen has been very successful. Farmers who have heard about the motor store have asked to be placed on its route, for by this means they are enabled to purchase their supplies at their door and market their produce without loss of time at the busiest season of the year, as the motor store pays cash for farm products.

Willys Gets Outstanding R. & L. Shares

Company Now Has Full Control —R. & L. Organization Continued

NEW YORK CITY, May 30.—The Willys-Overland Co., Toledo, O., has acquired the remaining shares of the R. & L. Co., this city, having last November purchased an interest in the company. This purchase, however, did not constitute a controlling interest, both J. T. Ranier and Paul Lineberger remaining the active principals in the business. The present purchase, however, gives the Willys company full control and hereafter the R. & L. Co. will act as a service and operating company exclusively, conducting the service buildings in this city, Newark and Brooklyn. Messrs. Ranier and Lineberger, who have retired as officers and directors, have formed a co-partnership and will have the sole selling rights for Garford and Willys commercial vehicles in the same territory. The whole R. & L. sales organization has been taken over by them. E. A. Williams, formerly president of the Gramm Motor Truck Co., Lima, O., becomes president of the R. & L. Co. C. T. Silver, distributor in this city of the Overland car, will take on the Willys-Knight, which the R. & L. Co. has handled heretofore.

Claims Against Pope Co. Filed

HARTFORD, CONN., May 30.—Colonel George Pope, as receiver of the Pope Manufacturing Co. in the Connecticut jurisdiction, has filed with the superior court a list of claims against the company and schedules of the amounts allowed and disallowed. The aggregate of claims filed is \$1,736,979. Those allowed with interest to May 1 amount to \$1,606,912.69. Interest items amount to \$53,910.13 while disallowance on claims amounts to \$175,592.68. Claims filed after April 22 total \$31,427.84. Among the large disallowances is the claim of E. J. Blake of this city, an aluminum founder filed as \$32,644.02 of which only \$635.92 was allowed. The claim of Albert L. Pope for \$44,537.71 was disallowed to the extent of \$44,330.40, the claim of George Pope for \$30,153.22 was

Market Reports for the Week

There were few changes in last week's market reports. Tin was the most important, having a drop of \$2.50 per 100 pounds. On Friday, a drop of \$1.00 occurred and it gradually went down to the closing on Tuesday. A violent drop of nearly \$20 occurred at London on Friday, following a high Banca auction, with sales of 2,300 tons. The local market was almost paralyzed. Fine Up-River Para declined \$0.01. The market was quiet but steady with previous quotations generally repeated.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Changes
Antimony	.05 3/4	.05 3/4	.05 3/4	.05 3/4	.05 3/4	.05 3/4	.....
Beams & Channels, 100 lbs.	1.26	1.26	1.26	1.26	1.26	1.26	.....
Bessemer Steel, ton	20.00	20.00	20.00	20.00	20.00	20.00	.....
Copper, Elec., lb.	.14 1/10	.14 1/10	.14 1/10	.14 1/10	.14 1/10	.14 1/10	—.00 1/10
Copper, Lake, lb.	.14 1/8	.14 1/8	.14 1/8	.14 1/8	.14 1/8	.14 1/8	.....
Cottonseed Oil, bbl.	7.15	7.17	7.17	7.13	7.09	7.23	+.08
Cyanide Potash, lb.	.17	.17	.17	.17	.17	.17	.....
Fish Oil, Menhaden, Brown	.40	.40	.40	.40	.40	.40	.....
Gasoline, Auto, bbl.	.16	.16	.16	.16	.16	.16	.....
Lard Oil, prime	.93	.93	.93	.93	.93	.93	.....
Lead, 100 lbs.	3.90	3.90	3.90	3.90	3.90	3.90	.....
Linseed Oil	.54	.54	.54	.54	.54	.54	.....
Open-Hearth Steel, ton	20.00	20.03	20.00	20.00	20.00	20.00	.....
Petroleum, bbl., Kans, crude	.75	.75	.75	.75	.75	.75	—.05
Petroleum, bbl., Pa. crude	1.90	1.90	1.90	1.90	1.80	1.80	—.10
Rapeseed Oil, refined	.59	.59	.59	.59	.59	.59	.....
Rubber, Fine Up- River, Para	.71	.71	.71	.70	.70	.70	—.01
Silk, raw, Ital.	5.10	5.10	5.10	5.10	5.10	5.10	.....
Silk, raw, Japan	4.50	4.50	4.50	4.50	4.50	4.50	.....
Sulphuric Acid, 60 Baume	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.	32.88	31.88	31.25	31.25	31.20	30.38	—2.50
Tire Scrap	.04 3/4	.04 3/4	.04 3/4	.04 3/4	.04 3/4	.04 3/4	.....

disallowed to the extent of \$30,000, that of C. E. Walker for \$30,153.22 was disallowed to the extent of \$30,000 while the claim of W. C. Walker for \$26,802.88 was disallowed to the extent of \$26,666.68. The largest allowed claim is that of the First National Bank of Boston for \$319,839.35. Other large allowed claims are Bond & Goodwin of Boston, \$175,950; Merchants National Bank of Worcester, \$103,046.89; Phoenix National Bank of Hartford, \$82,826.66; Empire Trust Co., New York, \$71,415; Chase National Bank, New York, \$241,977.53; United States Tire Co., Hartford, \$19,516.45; Corbin Screw Corp., New Britain, \$18,642.59; Amoskeag Savings Bank of Manchester, N. H., \$51,758; American Wood Rim Co., Onaway, Mich., \$19,127.26. The inventory of the Pope company assets filed in the superior court last December showed the company to have property in this state appraised at \$2,034,900. In addition the company has a bicycle and motorcycle factory in Westfield, Mass.

Krit Creditors Get 20 Per Cent. More

DETROIT, MICH., June 1.—An additional dividend of 20 per cent. has been paid today to the creditors of the Krit Motor Car Co., of Detroit, which brings the total up to date to 30 per cent. General Manager Crawford reports that business is very good and everything seems to indicate that it will keep up. A statement will be issued by the company during the latter part of the week.

To Sell Walpole June 8 as Going Concern

BOSTON, MASS., June 1.—Judge Dodge in the United States District Court today authorized the sale of the Walpole Tire & Rubber Co. on June 8. This is the second sale authorized by the court. The first, which was held on May 11, was set aside because the bid amounting to \$800,000 was below the upset price of \$1,150,000. No upset price has been fixed for the forthcoming sale but all bids must be accompanied by a deposit of \$60,000 to be valid. It was also decided to sell the entire property as a going concern.

Judge R. O. Harris and R. C. Fisher, the receivers, have been authorized to declare a second dividend of 4 per cent., and \$50,000 has been set aside for that purpose. This makes 8 per cent. which has been given creditors on all claims proved against the estate.

N. Y. Sales Company in Difficulties

NEW YORK CITY, June 1.—A petition in bankruptcy has been filed against the Merchants' Motor Sales Company, Inc., of 245 West Fifty-sixth street, by these creditors: Buyers-Sellers Automobile Co., Inc., \$1,034; Jerome C. Kraus, \$729, and Nathan M. Guinsburg, \$112. It was alleged that the company is insolvent, made preferential payments of \$500, and transferred merchandise and accounts of \$1,000. The company was incorporated on Nov. 17, 1913, with capital stock of \$120,000. Liabilities are \$15,000 and assets will not exceed \$2,000. It was alleged that during the past week several autos had been removed to places which are being watched by creditors, and others have been removed to places unknown.

N. Y. E. V. A. Holds Reception

NEW YORK CITY, June 2.—The New York Electric Vehicle Assn. held a reception on May 28, from 3 to 6 p. m., in connection with the special exhibition of electric passenger vehicles at the showrooms of the New York Edison Co.

The whole main floor was given over to the display of popular electric closed cars.

Alcohol the Future Fuel, Says Anglada

NEW YORK CITY, May 30.—At a meeting of the automobile classes of the West Side Y. M. C. A. in this city Joseph A. Anglada, chairman of the Metropolitan Section of the S. A. E., read a paper on the use of alcohol as a successor to gasoline.

Mr. Anglada quoted Prof. Magruder of Ohio State University who stated a few months ago that if all the gasoline engines in the country were to be run at their rated horsepower 10 hours a day the known gasoline supply would last

about 30 days. In other words, if the gasoline engines in use were run at their maximum power the amount of gasoline available would be sufficient only to run them 1 hour a day for about a year. He stated that various hydrocarbons had been suggested as substitutes for gasoline among which is kerosene, but that kerosene will never take the place of gasoline because of the impossibility of starting on it.

In bringing forward alcohol as a substitute Mr. Anglada stated that alcohol can be produced as long as the sun shines and the rain falls. Any gasoline or kerosene engine on the market can operate on alcohol as a fuel without any structural change whatever, but since alcohol contains approximately .6 of the heating value of gasoline by weight an engine adapted for gasoline or kerosene requires about 1.8 times as much alcohol as gasoline per horsepower hour. This consumption can be reduced, however, by using a carburetor which will thoroughly vaporize the alcohol and by increasing the compression. An engine designed for gasoline and kerosene will give about 10 per cent. more power when operated on alcohol, provided the necessary modifications are made. An engine specially built for alcohol will give from 20 per cent. to 30 per cent. more power than will a gasoline engine of the same size.

What Bearings for Worm Drive?

NEW YORK CITY, June 1—The S. K. F. Ball Bearing Co. has issued a bulletin on the characteristics of ball bearings for automobile worm drive. According to the S. K. F. company two distinct types of bearing are necessary for the proper mounting of the worm and wheel. On the worm

radial bearings must be employed to maintain the worm shafts in proper relation to the wheel, and a double thrust bearing must be used to take the thrust along the axis of the worm in either direction for the forward and reverse conditions.

On the wheel radial bearings must be used to locate the wheel properly relative to the worm, and single thrust bearings should be used to accept the thrust of the wheel along its axis. Accuracy is essential in these bearings from the viewpoint of efficiency and silence.

Analyzing the ball bearings constructed by the S. K. F. company particularly for worm gear mountings, the bulletin takes up the individual type of S. K. F. bearing and shows their fitness for this particular work. In pointing out the advantages of the radial bearing as made by the S. K. F. company, the self-aligning ball and socket principle to meet shaft deflections is mentioned. In the double thrust bearing for the worm the advantage claimed is the capacity of the bearing to adjust itself to shaft deflections.

The bulletin states that in using the double thrust bearing on the worm wheel both of the radial bearings should be free laterally on the outside races while the inside racers should in both cases be secured locked to the wormshaft. The worm should be held without any end play whatever, in order that it will act in an efficient and noiseless manner. The S. K. F. company states that the ideal lubricant for worm drive is pure castor oil, but that this is too expensive and commercial castor oil contains ingredients which are injurious to bearings. The efficiency claimed for a ball bearing worm drive installed in this manner and properly lubricated is approximately 95 per cent.

Automobile Securities Quotations

New York City, June 3—The automobile securities market was very quiet during the past week, the only changes of note in the way of gain being due to reports of better business, or to manipulation. There were several movements indicating reactions, Maxwell stock, which has been gaining steadily for several weeks, showing a reversal of 1 3-4 on the common, 4 points on the first preferred and 2 5-8 on the second preferred, while the oil stocks, which were losing for

several weeks have begun to regain their former level. General Motors common is up 12 3-4 points this week as compared with last, the report of big earnings for the coming year being in some measure responsible. Reo Motor Car Co. stock, being ex-dividend, is slightly weaker than last week. Willys-Overland continues strong. The complete list of changes for the week, together with the daily quotations follows:

Security	Wednesday Bid	Asked	Thursday Bid	Asked	Friday Bid	Asked	Saturday Bid	Asked	Monday Bid	Asked	Tuesday Bid	Asked	Week's Change	1913 Bid	Asked
Ajax-Grieb Rubber Co. com.	220	..	220	..	220	..	220	..	220	..	220	..	..	155	..
Ajax-Grieb Rubber Co. pfd.	99	99	99	99	99	99	99	99	99	99	99	99	..	95	100
Aluminum Castings pfd.	98	100	98	100	98	100	98	100	98	100	98	100	..	98	100
Case T. M. Co., J. I.	83	87	84 1/2	87	85	87	85	87	84 1/2	87	84 1/2	87	+ 1/8	..	..
Chalmers Motor Co. com.	100	..	100	..	100	..	100	..	101	107	101	107	+ 1	128	138
Chalmers Motor Co. pfd.	92	92	92	92	92	92	92	92	95	92 1/2	95	92 1/2	+ 1/2	98	102
Electric Storage Battery Co.	52	52 3/4	52	52 1/2	52	52 1/2	52	52 1/2	52	52 1/2	52	52 1/2	..	..	..
Firestone Tire & Rubber Co. com.	303	307	303	307	303	307	303	307	305	309	305	309	+ 2	259	263
Firestone Tire & Rubber Co. pfd.	107	110	107	110	107	110	107	110	107	110	107	110	..	105	107
Garford C. pfd.	75	85	78	85	75	85	75	85	75	85	75	85	..	..	97 1/2
General Motors Co. com.	97	98	93 1/2	94	93	94 1/2	93	94 1/2	96 1/4	96 1/2	96 1/4	96 1/2	+ 12 1/4	26	30
General Motors Co. pfd.	94 3/4	95 1/4	97 1/2	94	93 1/2	94	93 1/2	94	94	93	94	93	..	73	74 1/4
B. F. Goodrich Co. com.	25 3/4	26 1/4	25 3/8	25 7/8	25 1/2	25 1/2	25 1/2	25 1/2	25 1/2	25	24 1/2	25	- 1/2	29 1/2	32
B. F. Goodrich Co. pfd.	88	89	88	89 1/2	88	89 1/2	88	89 1/2	88	89	88	89	..	91	94
Goodyear Tire & Rubber Co. com.	178	182	178	182	178	182	178	182	172	176	172	176	- 6	312	317
Goodyear Tire & Rubber Co. pfd.	98 1/2	100	98 1/2	100	98 1/2	100	98 1/2	100	98	99 1/2	98	99 1/2	- 1/2	98 1/2	99 1/2
Gray & Davis Co. pfd.	95	102 1/2	95	102 1/2	95	102 1/2	95	102 1/2	95	102 1/2	95	102 1/2	..	..	..
International Motor Co. com.	..	5	..	5	..	5	..	5	..	5	..	5	..	5	6
International Motor Co. pfd.	3	10	3	10	3	10	3	10	3	10	3	10	..	10	15
Kelly-Springfield Tire Co. com.	52	53	50	53	50	53	50	53	57	56	58	58	+ 4	..	..
Kelly-Springfield Tire Co. pfd.	135	145	135	145	135	145	135	145	140	150	140	150	+ 5	..	..
Lozier Motor Co. com.	..	26	..	26	..	26	..	26	..	25 1/4	..	25 1/4	..	15	20
Lozier Motor Co. pfd.	30	43	30	43	30	43	30	43	30	43	30	43	..	..	92
Maxwell Motor Co. com.	14 1/2	14 3/4	14 1/4	15 1/4	14 1/2	14 3/4	14 1/2	14 3/4	14 1/2	14 3/4	14 1/2	14 3/4	- 1 1/4	3	5
Maxwell Motor Co. 1st pfd.	45 1/2	46	45 1/2	46	44 1/2	45 1/2	44 1/2	45 1/2	44 1/2	45 1/2	44 1/2	45 1/2	- 4	32	36
Maxwell Motor Co. 2d pfd.	19 1/4	19 3/4	19 1/4	20	19	19 1/2	19	19 1/2	18 1/2	19 1/4	17 1/2	18 1/2	- 2 1/2	10	15
Miller Rubber Co.	128	135	128	135	128	135	128	135	128	135	128	135	..	138	147
New Departure Mfg. Co. com.	122 1/2	124	122 1/2	124	122 1/2	124	122 1/2	124	123	125	123	125	+ 1/2	..	..
New Departure Mfg. Co. pfd.	105	107	105	107	105	107	105	107	105	107	105	107	..	..	..
Packard Motor Co. com.	103	..	103	..	103	..	103	..	103	..	103	..	..	..	..
Packard Motor Co. pfd.	98 1/2	100 1/2	98 1/2	100 1/2	98 1/2	100 1/2	98 1/2	100 1/2	98 1/2	100 1/2	98 1/2	100 1/2	..	..	..
Peerless Motor Co. com.	18	25	18	25	18	25	18	25	18	25	18	25	..	40	50
Peerless Motor Co. pfd.	..	62 1/2	..	62 1/2	..	62 1/2	..	62 1/2	..	62 1/2	..	62 1/2	..	..	96
Pope Mfg. Co. com.	..	1 1/2	..	1 1/2	..	1 1/2	..	1 1/2	..	1 1/2	..	1 1/2	..	12	15
Pope Mfg. Co. pfd.	..	8	..	8	..	8	..	8	..	8	..	8	..	45	48
Portage Rubber Co. com.	..	40	..	40	..	40	..	40	..	40	..	40	..	35	40
Portage Rubber Co. pfd.	..	90	..	90	..	90	..	90	..	90	..	90	..	90	95
*Reo Motor Truck Co.	8 3/4	9 1/4	8 3/4	9 1/4	8 3/4	9 1/4	8 3/4	9 1/4	9 1/2	9 1/2	9 1/2	9 1/2	+ 3/4	11	12
*Reo Motor Car Co.	27	28 1/2	27	28 1/2	27	28 1/2	27	28 1/2	18	19	18	19	- 9	20	22
Rubber Goods Mfg. Co. pfd.	100	110	100	110	100	110	100	110	100	110	100	110	..	..	..
Russell Motor Co. com.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Russell Motor Co. pfd.	40	50	40	50	40	50	40	50	40	50	40	50	..	..	..
Splitdorf Electric Co. pfd.	47	49	47	49	47	49	47	49	47 1/2	48 1/2	47 1/2	48 1/2	+ 1/2	..	..
Stewart Warner Speedometer Corp. com.	97	99	97	99	97	99	97	99	97	99	97	99	..	..	..
Stewart Warner Speedometer Corp. pfd.	34 1/2	34 1/2	34	35	33 3/4	34 3/4	33 3/4	34 3/4	33 1/2	34 1/2	33 1/2	34 1/2	..	24 1/4	25 1/2
Studebaker Co. com.	88 1/2	90	88 1/2	90	88 1/2	90	88 1/2	90	88 1/2	90	88 1/2	90	- 1 1/2	89	90 1/4
Studebaker Co. pfd.	65	75	65	75	65	75	65	75	73	80	73	80	+ 8	85	88
Texas Company	142	143	142	143	144 1/2	145	144 1/2	145	145	146	145	146	+ 4 1/2	..	..
U. S. Rubber Co. com.	58 1/2	58 3/4	58 3/4	58 3/4	58 1/2	59	58 1/2	59	58 1/2	59	58 1/2	59	+ 1 1/8	60	61
U. S. Rubber 1st pfd.	102 1/2	103	102 1/2	103	102 1/2	103	102 1/2	103	102 1/2	102 1/2	102 1/2	102 1/2	- 1/4	104 1/4	105
Vacuum Oil Co.	220	225	222	226	224	226	224	226	225	228	226	228	+ 5	..	..
White Co. pfd.	107	110	107	110	107	110	107	110	107	110	107	110	+ 3	58	65
Willys-Overland Co. com.	74	75	79 3/4	80	78	80	78	80	78	80 1/2	78	80	+ 3	58	65
Willys-Overland Co. pfd.	94	96	94	96	94	96	94	96	95	94	96	94	..	85	94

*The par value of these stocks is \$10; all others \$100. [†]Ex-dividend.

Germany's Plans Shaping for 1915 All-Nation Road Race

Private New Boulevard Near Frankfurt Probable Course—Stock Class Only—
A Day for Light Cars

BERLIN, May 20—The movement for a big international road race in Germany in 1915 is in a very fair way of success. Unless unforeseen things happen it is safe to say that either in July or in August of next summer a stock car race will be held and very likely on the private, specially built automobile boulevard which is nearing completion in the vicinity of Frankfurt.

For some time prominent manufacturers and tradesmen and sportsmen have exchanged views on the racing subject. The German automobile club has not taken an official part in the preliminary discussion but of course there could be no race except under the club's sanction, and when the right time comes the big German club will have something to say. Just at present it appears there is no definite understanding as to the rules and just what cars are to be accepted. No one seems to be in favor of a race or contest for racing cars neither for that class of stock or touring cars which actually consists of racing cars.

From information given by some of those who are agitating the race it would appear that there will be two days' race, the first day being reserved for light cars weighing less than 750 kilos and the second day for cars of over 750 kilos but not more than 1,000 kilos. It is possible that there will be a cylinder area stipulation and that the maximum cylinder capacity will be set at 4.5 liters. Some are in favor of limiting the fuel supply and suggest 20 liters per 100 kilometers. All the big cars are to be in a position to be equipped after the race with a touring car body to seat 4 passengers.

The distance for both days' races is to be not less than 800 and not over 1,200 kilometers.

Hearne in Case Car Stars at Washington

WASHINGTON, D. C., May 30—Three thousand people today saw a program of eight motor car and four motorcycle races run at Bennings track under the auspices of the National Capital Motorcycle Club. Eddie Hearne was the hero of the day, winning 3 events in a Case. He also drove an exhibition mile in Disbrow's Jay-Eye-See in 66 seconds. The track, a mile affair, is sandy and a rain during the afternoon made it slow. The summaries:

WASHINGTON CUP—5 MILES			5-MILE FREE-FOR-ALL		
Car	Driver	Time	Car	Driver	Time
Mercer	Donn Moore	6:22½	Case	Eddie Hearne	5:39
Apperson	Gardner Orme		Case Comet	J. Raimey	
Washington	C. Pratt		Bullet	F. Horey	

3-MILE CLASS E NON-STOCK			5-MILE MATCH RACE		
Car	Driver	Time	Car	Driver	Time
Bullet	Fred Horey	3:40	Chevrolet	E. French	7:16½
Scat	L. Heinemann		Reo	Frank Stewart	
Tornado	Joe Cleary		E-M-F	J. E. Crowder	

AUSTRALIAN PURSUIT RACE			MILE EXHIBITION		
Car	Driver	Time	Car	Driver	Time
5 MILES			Jay-Eye-See	Eddie Hearne	.66 sec.
Case Comet	John Raimey		1-MILE TIME TRIAL		
Bullet	Fred Horey		Case Comet	J. Raimey	1:03½

3-MILE NOVELTY RACE		
Car	Driver	Time
Case	Eddie Hearne	18¾

Foreign Cars for Sioux City Races

NEW YORK CITY, May 30—E. R. Schultz, manager of the Sioux City Motor Speedway, has been advised by W. F. Bradley, the Speedway's foreign representative, that he expects to secure the entry of some of the fastest European cars for the 300-mile sweepstakes on July 4. Mr. Bradley is confident that the Belgian Excelsior racer and the German Bugatti car will be among the starters and it is hoped to have Christiaens on the former and Friederich on the Bugatti.

100-Mile Race for Louisville

LOUISVILLE, KY., May 30—A 100-mile automobile race will be run on July 4 at Douglas Park race track. The event is being staged by a syndicate of promoters in which several Louisville men are interested. A sum of \$1,000 in cash will be distributed among the winners of the event. The driver

of the first car to pass under the wire will receive \$500, the driver of the second car \$300 and the driver of the third car \$200. If the plans now under consideration work out without hitch anywhere from fifteen to forty of the fastest machines on the market will start in the contest.

Philadelphia Holds Run to Atlantic City

PHILADELPHIA, PA., May 30—Ninety-eight cars, of which all but a dozen checked in within the specified time limit, took part in the Philadelphia *Inquirer* Roadability run today, from Philadelphia to Atlantic City, N. J. So successful did the event prove that it is believed it will pave the way for numerous events of its kind during the outdoor season. Valuable prizes in cash and plate were the magnet that attracted the largest number of entrants in such a run in recent years, and it proved the feature event of Atlantic City's Carnival Week.

The affair was a secret time schedule one and participants were allowed wide latitude in starting and finishing. The start, which was from the *Inquirer* Building, could be made at any time between 9:30 a. m. and 1:30 p. m., the only stipulation being that cars finish at Atlantic City not later than 5:30 p. m., after which specified time limit no arrival would be recorded. The Mayors of Philadelphia, Camden and Atlantic City each chose a time for completion of the run, the three times were added together and divided by three. The result was 3 hours 49 minutes official time. The nearness of a number of cars to this figure was remarkable. Competition was keen, only 2 minutes separating the first and tenth prize winners. Winner of first prize was only 15 seconds slower than the secret time.

R. S. Marsden, of Lansdale, Pa., driving a Pullman, finished in 3 hours 49 minutes 15 seconds and won first prize, \$200. Second prize of \$150 was awarded W. H. Gilmour, Maxwell, time 3:49:30. Third prize, \$100, to Dr. S. Leon Gans, Buick. Fourth prize, \$50, A. P. Ryan, Studebaker.

The officials of the run were: Referee, E. C. Johnson; starter, G. Hilton Gantert; finish judge, J. C. Bartlett; chief timer, P. Russell; chief scorer, T. S. Johnston; pilot, W. P. Herbert; pathfinder, H. DeGroat; A. A. A. representative, P. D. Folwell.

July Sociability Run for Louisville

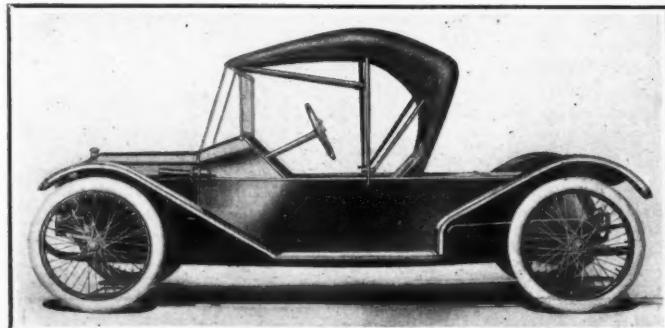
LOUISVILLE, KY., May 28—Plans for a "sociability" run, to be participated in by members, were discussed at a meeting of the executive committee of the Louisville Automobile Club at the Louisville Hotel yesterday afternoon. The run will be made about the middle of next month, but the route has not been decided upon as yet, that matter and other details being left in the hands of the Runs and Tours Committee, of which Dr. J. W. Clark is chairman.

Truck Club To Meet June 17

NEW YORK CITY, June 2—The next meeting of the Motor Truck Club will be held June 17 in the auditorium of the Automobile Club of America, 252 West Fifty-fourth street. The subject of the evening will be the Garaging and Care of Motor Trucks, which will be taken up in a series of papers illustrated by lantern slides specially taken for the purpose and showing the bad points of some fifty odd garages in New York City, the remedies for which will be given in the papers. The new scheme of the club for reporting all cases of laudable or improper operation of trucks on the road will also be taken up.

Oklahoma Road Associations Merge

OKLAHOMA CITY, OKLA., May 30—On the last day of the convention of the Ozark Trails association at Tulsa, Okla., this week, the 200 delegates from Oklahoma proper met and temporarily organized an Oklahoma association for the promotion of the good dirt road movement throughout the state. This was the most important work done in the educational movement for good roads in Oklahoma. The new association consolidates the four good roads associations now



New Los Angeles cyclecar with V-radiator

within the state: the Meridian Highway, the National Postal Highway, the Ozark Trail, and the Oklahoma, Texas and Gulf Highway associations.

Club Quarters for M. D. Contest Association

NEW YORK CITY, June 2—At a recent meeting of the Motor Dealers' Contest Assn., held at the Gainsborough Studios, the directors of the association discussed a proposition submitted by Mr. Ball of the studios, which related to club quarters for the organization.

A meeting of the stockholders has been called to be held on June 5 at 12:30 p. m. at the Gainsborough Studios, for the discussion of the club idea mentioned above.

Discusses Ideal Car for 1916

NEW YORK CITY, June 1—Charles E. Davis, M. E., who will open the discussion on the ideal car at the coming summer meeting of the Society of Automobile Engineers has presented his views in the May issue of the S. A. E. bulletin. He says in part:

"The future car for economy, luxury and business purposes will be constructed, as far as the body is concerned, with a harmonious streamline effect. Substantial material will be used in body parts, fenders, bonnet, radiator and wheels combined in such a way as to eliminate moulded surfaces, sharp corners, dust-pocket projecting hinges and handles, and the lamp outfit will be blended into the general outline. The tool box, tire and luggage carriers will be concealed in dust-proof compartments provided for in the body design. The wheelbase should be 128 to 132 inches, for cars accommodating two to five persons."

Some of the other requirements to meet Mr. Davis' ideal are a close-connected water-jacketed carburetor with steering post regulation, front wheel brakes which act simultaneously on all four wheels and another set of brakes acting only on the rear wheels. Cantilever rear springs are specified with worm drive, four speeds, or, if a gas electric transmission is used, at least ten speeds forward with preferred electric or pneumatic shifting. Side lights on fenders should be movable to cover sharp bends in road and one centrally located headlight is needed, having a deflector to insure safety.

P. C. & K. Adds Lexington Car

NEW YORK CITY, June 1—in becoming Eastern distributors for the Lexington four, the firm of Partridge, Clark & Kerri-gan, Inc., announces the completion of its line of automobiles. The line now consists of the Briscoe, Lexington, Pathfinder and Premier-Weidley. The newest addition, the Lexington, has twin muffler and exhaust system.

NEW YORK CITY, June 2—A test was made recently on Eagle Rock hill near Orange, N. J., with the idea of showing the advantage of the duplex drive of the Detroit electric over the ordinary drive. It is claimed that the car, carrying five passengers, covered the mile long, 25 per cent. grade hill at the rate of 8 miles an hour.

Vanderbilt-Grand Prix Start February 22

NEW YORK CITY, June 2—The Vanderbilt cup race will start February 22, the Grand Prix March 7 and the Panama-Pacific cup race, March 14, according to an announcement of the Panama-Pacific officials today. A map of the course for the races was published in THE AUTOMOBILE for April 30. The races will be run on the exposition grounds.

Announcement was also made of a proposed reliability run from this city to San Francisco, to end at the Panama Exposition in 1915. Chairman Mudd, of the A. A. A. Touring Board, who is at present in Chicago, is working on the plans of this tour. Mr. Batchelder states that the tour will be made with very reasonable restrictions for the participants.

Two Changes in Stutz Staff

INDIANAPOLIS, IND., May 30—Harry W. Anderson, Atlanta, Ga., who has for over 3 years past represented the American Motors Co. in the South, has been appointed assistant sales manager of the Stutz M. C. Co. and has already taken up his duties in connection with his new position.

Bruce Daniels, advertising manager of the Stutz company, has resigned to accept a similar position with the Prest-O-Lite Co., this city. He was previous to his connection with the Stutz company, connected with the Motor Car Mfg. Co., this city.

Add Cyclecar to Production of Pullman York Factory?

In Addition to Enlargement of Operations Creditors' Committee Considers Contract with LaVigne Company

YORK, PA., May 30—The Pullman Motor Car company has under consideration plans for a big expansion of operations at its factory in this city, and besides engaging in the manufacture of its own product will build a large number of automobiles for the LaVigne Motor Co., Detroit, Mich.

Representatives of the latter company and a committee of creditors of the Pullman company, who were appointed recently to supervise the work at the York factory, will shortly decide on a definite contract and the work of building the cars will begin. Representatives of the LaVigne company have visited York frequently within the past several weeks.

The character of the Detroit car is such as not to be in competition with the Pullman in any way. It is a light weight small car in two chassis models, including a four-cylinder two-passenger roadster and a four passenger four-cylinder touring car. The former lists at \$595, equipped, and the latter at \$645, equipped. It is planned to build both models at the York plant.

New Los Angeles Has V Radiator

LOS ANGELES, CAL., May 25—A new model cyclecar has recently been announced with side-by-side seating, electric lights, water-cooled motor with a V-type honeycomb radiator and friction disk transmission as its principal features, by the Los Angeles Cyclecar Co., Compton, Cal.

It sells for \$495, fully equipped with two 8-inch electric headlights, and tail light, horn, top, storm curtains, adjustable windshield and full set of tools.

The motor has a bore and stroke of 2.75 by 4 inches which gives a horsepower rating of 12.08, but it is stated that it will develop 18. Oiling is by plunger pump and cooling is effected by the thermo-syphon system. The connecting-rods are heat-treated drop forgings and the crankcase is made of aluminum. The crankshaft is supported on two bearings, the front one being 1.375 by 2.3125 inches and the rear 1.5 by 3 inches. The camshaft is .875 inch in diameter, the diameter of the valves is 1.25 inches and the lift .25 inch.

From the friction transmission the drive is by double side chains to the rear wheels. A feature of this construction is that the chains are inclosed. The front axle is a 1 by 1.5-inch I-beam construction and the rear axle is the same. The frame, which is underslung, is pressed steel, channel section, thoroughly riveted and gusseted and semi-elliptic springs are used. Two sets of brakes are furnished, one on the jack-shaft and a pair on the hubs.

The wheelbase is 100 inches, the tread 44 and 28 by 3 inch wheels are used.

DES MOINES, IA., June 3—Twelve cars have been entered for the Little Glidden tour which will start from Des Moines on July 1 and reach this city on July 3 in time for the big speedway races on July 4. The route will be via Mason City, Clear Lake, Algona, Spirit Lake, Okoboji, Storm Lake, and Le Mars.

Ford Company Wins Accident Suit

DETROIT, MICH., June 2—The Supreme Court of the State of Michigan has rendered a decision in favor of the Ford Motor Co., of Detroit, against Jan Janik, who claimed to have been injured by a motor car belonging to the company. The whole question was a matter of deciding the ownership of the car which struck Janik. According to the evidence John I. Werner, agent of the Ford company in Bronson, Mich., came to Detroit with a prospective buyer named Klein, and purchased a car at the Jefferson salesrooms of the Ford concern, paid for it and got a driver to take him to the city limits. It was while on the way that Janik was struck and as it had a Ford company's number he brought suit against the Ford company. The case came up in the Wayne county court and it was claimed by the Ford company that the owner of the car was Werner who had paid for it and that the driver was serving him, Werner, and not the Ford company. The lower court had already sustained the views of the Ford company.

Stutz Building \$100,000 Addition

INDIANAPOLIS, IND., June 1—The new factory of the Stutz Motor Car Co., of this city, now under construction, will cost, when completed, more than \$100,000. The plant, as announced in THE AUTOMOBILE for March 5, will adjoin the factory occupied by the former Stutz Auto Parts Co., which is now a part of the Stutz Motor Car Co.

The new building will be one of the most up-to-date automobile plants in Indianapolis. It will be equipped throughout with the newest machinery for making automobiles which can be bought, and the building plans contemplate several novel features in the way of convenient construction for the manufacture of cars which officials of the company say can be seen in no other factory in the country. The building will have a frontage of 80 feet on Capitol avenue and 204 feet on Tenth street. It will be four stories and made of concrete, with brick facings. Steel frame windows will be used, furnishing enough light to put itself in a class with most modern constructions. The general offices of the company and the assembly plant, which are now located at 430 North Capitol avenue, will be moved to the new plant. The offices will be on Capitol avenue on the first floor. The back part of this floor will be used as a storage room for such heavy parts as frames, motors, transmissions and axles. The road test will be located on this floor also. The second floor will contain the first and final assemblies and the third floor will house the paint shop and the finishing department. The top floor will be used for top building and the upholstery shop.

Porte-cocheres will be erected at both the Capitol avenue and Tenth street entrances to the building. A big sign displaying the Stutz trade-mark, The Car That Made Good in a Day, will be built into the top part of the center of the building.

The present retail salesrooms of the Stutz company, which are at the Carl G. Fisher Auto Co., 400 North Capitol avenue, will not be moved. The Fisher company has the state agency for the Stutz cars and will continue to handle them in this territory. The company will continue its present selling plan, according to Mr. Myers, and will distribute its cars through distributing points in the larger cities as has been the custom.

Spoke Protector Made by Rudge-Whitworth

COVENTRY, ENG., May 25—Rudge-Whitworth, Ltd., has recently brought out the wire wheel spoke case shown on page 1193. It consists of two metal disks, the inner one being permanently bolted on and the outer one quickly removable.

The object of the device is to overcome the difficulty of cleaning wire wheels as this feature is probably the greatest objection to their use, and even with the special brushes now made for the purpose it is a tedious operation to clean the spokes thoroughly.

The inner cover is rigidly bolted to the hub shell while the outer one, conical in shape, is held in position by a central screw which for convenience, has two slots crossing at right angles in the head instead of only one. Owing to this simple yet rigid fastening, the cover is readily detachable by removing this screw and for this reason it is not necessary to fit hand holes to make the tire valve accessible.

As will be noted in the illustration of the cover attached to the wheel the appearance of the car is in no way impaired by having the spokes inclosed in this way but if anything, the appearance is enhanced. In addition there are two other small advantages worthy of mention. One is the fact that the resistance to the wind is slightly reduced and the other is that the drilling and tapping of the hole for the retaining

screw provides a convenient means for lubricating the hub bearings.

Cyclecar in City and Suburban Delivery Service

ST. LOUIS, Mo., May 30—The McQuay-Norris Mfg. Co., manufacturer of the Leak-Proof piston rings, has adopted the use of the cyclecar in its city and suburban delivery service. This car is a Comet, made by the Comet Cyclecar Co., Indianapolis, Ind. The cyclecar has proved a time saver as well as being economical where small articles such as piston rings are to be delivered throughout the city and the suburban towns. The adaptability of the cyclecar to city and suburban delivery service has been successfully tried out by other companies and these little cars have proved faster than the parcel post or the local express service.

Repair of Taxicab Bodies by Botiaux System

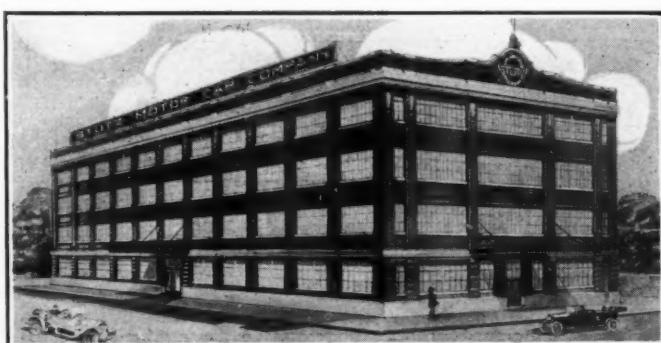
PARIS, May 23.—The new type of body built on the Botiaux system, described in THE AUTOMOBILE for May 21, has been adopted by one of the Paris taxicab firms on account of the facilities it affords for carrying out repairs. Where the damage is slight, the paste is put over the damage, the coloring matter being mixed with the paste, so that it is only necessary to give a final coat of varnish. The taxicab construction, however, is different from that for ordinary cars. The panels are made detachable; they are placed on the main frame, a beading put over them, and screws passed through beading and panel into the wood frame. Thus to take off a panel it is only necessary to withdraw a few screws. A taxicab with a whole back or side staved in can have a panel replaced and be on the road again within half an hour, providing, of course, that the main frame members have not been broken. Rounded backs are avoided on taxicabs, for in the case of damage to the side panels they generally necessitate the removal of the back panel also. With the Botiaux system it is just as convenient to have rounded as right angle panels. For taxicab work the back and sides are often one piece.

Determines Damages for Minor Injuries

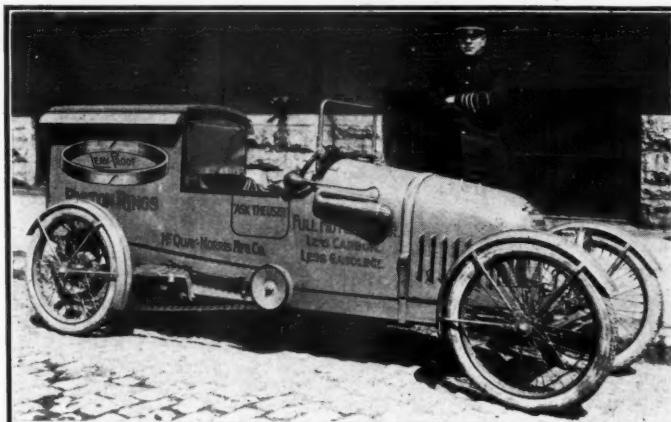
DETROIT, MICH., June 2—In a decision rendered by the Supreme Court of the State of Michigan, yesterday, having reference to the workmen's compensation act, it was held in substance, that compensation for a number of minor injuries, in the aggregate, shall not be larger than that for the permanent loss of a member, incurred in the same accident. Rather, the total sum the injured man receives, shall include both the minor injuries and the complete loss.

By its decision, which was written by Justice Ostrander, the court set aside a decision of the industrial accident board.

The case concerns the Pere Marquette railroad and one of its employees, Philip Limron, who had been run over by an engine sustaining a broken shoulder, a crushed foot and



New \$100,000 Stutz addition in residence section of Indianapolis



Comet cyclecar used for delivery work by McQuay-Norris Mfg. Co.

some minor injuries, while his other foot was taken off. The industrial accident board decided that Limron was entitled to receive one-half of his weekly wages for the period of total disability due to his injuries, other than the loss of the foot, and at the expiration of that time, should begin to receive the prescribed compensation for a foot, that is, one-half of his weekly wages for 125 weeks, provided that the entire payments should not exceed more than 500 weeks.

In his opinion Justice Ostrander said in part: "The act provides that when, as a result of an industrial accident, the incapacity for work is total, the employer shall pay a weekly compensation equal to one-half the average weekly wages for a period not exceeding 500 weeks. This is the longest period of compensatory payments. A period of disability is in certain cases deemed to exist. For the loss of the foot, the period is 125 weeks. For the loss of any two members, as hands, arms, eyes, feet, legs, the period of total disability is deemed to be 500 weeks unless the weekly payments amount to \$4,000 in a shorter period. If one of the results of accident is the loss of a foot, the period of disability is 125 weeks, although it may be in fact only 6 weeks. The period is not extended because as a result of the accident the employee was in fact totally disabled for a period of 125 weeks, or for any shorter period. If he is in fact, disabled for the loss of a foot, or otherwise, for a greater period than 125 weeks, compensation continues until disability is removed or the maximum of compensation is paid. When the period of disability ends, compensation ceases."

The Supreme Court took issue on the point that the payment for the foot shall not begin until the total disability for the other injuries had been removed. On this basis the total disability for injuries other than the loss of the foot might cover a period of 375 weeks, which according to the court would be unjust, as unscrupulous persons might readily take advantage of it.

Carbon Beneficial to Sleeve Valve's Operation

THE sleeve valve thrives upon carbon; instead of endeavoring to prevent an accumulation all sorts of devices are resorted to in the various works where the sleeve valve is produced to cause carbon to accumulate. This accumulation of carbon, which is the bane of the poppet valve's existence, is the final essential finishing touch to the sleeve valve. Providence seems in the case of the sleeve valve to deposit the carbon just where it is required, rectifying any small errors in clearances or adjustments or small ring leakages which may have crept into the construction. And the user is advised to be most careful about its removal—not to interfere with the deposit unless through some extraordinary conditions the character of the accumulation partakes of the scale-like formation which upon severe use of the motor becomes incandescent, as shown by its brown color and projecting scale-like form. Happily, such scale is seldom encountered, and when it may have formed as a result of the cause described, the user is advised to remove it, not with the use of a sharp-edged metal tool, but by employing a coarse, rough piece of fabric, which when rubbed heavily upon the surface to be cleaned, will serve to carry away the loose flakes, which could possibly cause self-ignition, without exposing the polished surfaces of the head and piston. A carbon deposit upon the cylinder head rarely takes the form of scales because of its perfect cooling.

My observation leads me to believe that the tendency to carbonize is growing with the lowering in the grade of the petrol supplied for fuel purposes. In short, it is my experience, supported by the judgment of many others with whom I am associated, that the principal source of carbon deposit is the imperfect combustion experienced regularly upon the road with all carbureters and engines. It is doubtless true that road dust and lubricating oil have a considerable influence in the accumulation of carbon upon the surfaces of the explosion chamber and head of the piston and valves in an indirect manner, but the carbon itself, I am convinced, comes largely from imperfectly consumed fuel. The lubricating oil furnishes the moist element which collects and holds this gasoline carbon from the time of the occasional periods of imperfect combustion until it is thor-

oughly burned on by later higher temperatures under full throttle.

Attention is properly called to the fact that the sleeve valve engine, while it shows as great thickness of carbon deposit as the poppet valve, does not suffer from its presence, and makers of the latter are admonished to study the cause of the poppet valve's serious defect. It is also asserted that the two-stroke engine, as well as the sleeve valve, is free from the damaging effects of the carbon deposit, but no explanation of this condition is vouchsafed.

That the conclusions of these authorities are well based is evident from the fact that every owner of a sleeve valve motor will testify that the power and sweet running of his engine increases with use, which fact has caused a great deal of speculation.

A limited carbon deposit accomplishes two things: First, it increases to a limited extent the compression by reducing the compression space. Second, the coat of carbon acts as an insulator and prevents the transmission of heat from the piston top and cylinder head, which heat, instead of wasting through these walls into the cooling water or base chamber, is put to useful work. In the limited extent of this accumulation lies the secret of the non-knocking of the sleeve valve motor.—By CHAS. Y. KNIGHT, in *The Autocar*.



Two views of Rudge-Whitworth wire wheel spoke case

Rudge Not Affected by Pugh Decision

Suit Decided by British House of Lords Dealt with Earlier Pugh Patent than that Under Which Wheels Are Built

NEW YORK CITY, June 3—In a special cablegram to THE AUTOMOBILE from John Pugh of the Rudge-Whitworth Co., Coventry, England, he states that the patent which was the basis of a suit recently brought by Pugh against Riley, Ltd., and the British Gregoire Agency, is not the patent under which the present Rudge-Whitworth wheels are manufactured.

The suit brought by John Pugh resulted in a favorable decision for the respondent in two lower courts and was finally appealed by the Riley and British Gregoire interests to the House of Lords. Here the decisions of the two lower courts were reversed and in his opinion the Lord Chancellor stated that he could find no justifiable reason to decide that the Riley wheel was an infringement of that Pugh patent upon which the suit was based. Therefore, he dismissed the case.

The decision was reported in THE AUTOMOBILE for May 14, 1914, on page 1034, and according to John Pugh of the Rudge-Whitworth Co. the facts in the Pugh patent case have a somewhat different bearing on the wire wheel situation than would be gathered from this report, in which it was stated that the patent affected by the decision was the one upon which the Rudge wheel construction is based.

According to Mr. Pugh, the annulled patent applied for in 1908 was divided out from other patent applications by arbitrary action of the British Patent Office. Otherwise it appears from the judgment, that the patent would have been upheld by the Peers. It will be appreciated that in other countries the patent is undivided and is probably valid even if divided. The present Rudge-Whitworth wheel does not come under this Pugh patent but under that dated 1911, 3 years later than the patent in dispute.

Studebaker Six in General Test

BUFFALO, N. Y., May 31—A Studebaker Six has started on the first of five separate 200-mile runs, on an economy, reliability and comfort test. One thousand miles in all will be the distance traveled by the car. The seven-passenger Studebaker will carry its full quota of passengers and will travel along at the rate of 25 miles an hour each Sunday for 5 consecutive Sundays. It will be a 1,000-mile economy and reliability test. Passengers will be weighed and close and careful record will be kept of the oil, gasoline and water consumed on each run.

Pit Efficiency Prize Won by Thomas in the Delage

(Continued from page 1181)

right rear wheel. He took on gasoline 4 times and oil once. One other stop was occasioned by work on the spark plugs.

A driver whose running was watched with particular interest was Carlson in the Maxwell 25. The interest was due to the fact that Carlson ran on kerosene. The only fuel carried in the Maxwell during the race was kerosene except for a small half pint priming can of gasoline which was used in starting. Carlson made 10 stops at the pits all but two of which were necessitated by tire trouble.

Duesenberg Makes 19 Stops

Duesenberg No. 42 piloted by Rickenbacher made 19 stops during the 500 miles. He changed only 4 tires, the most of his stops being due to engine trouble. He lost a great deal of time in trying to start the engine after each stop as four or five men usually had to take turns at the crank before the engine would start. A great deal of his engine trouble was with his plugs, but there was not nearly as much time spent on work as there was in getting the motor started. For instance, his last stop was occasioned by a change on the left rear tire and he was already to go in about 40 seconds but it took 7 minutes to get the engine started and four men to crank. He lost in all 36 minutes at the pits.

Mulford in his Mercedes Special made 7 stops all together, changing 6 tires. The most serious loss of time was occasioned by breaking the driving chain on the home stretch just above the judges' stand. Mulford walked down to his pit, got a new chain, went back and put it on, using 14 minutes in the process. He lost 13 minutes 50 seconds another time in repairing a broken oil pipe which had been leaking for some time.

Willie Haupt in the Duesenburg made fifteen stops before he finished. The first four of them were to take on water as were a number of the others. Every time the radiator cap was taken off the steam and hot water spouted out like a geyser. The engine seemed to be heating up more than the other Duesenberg and the pump was not working properly.

Five times new spark plugs were put in the motor. It seemed that the high compression caused them to break. Nine tires were changed during the race. The clutch was not disengaged in stopping. Seemingly it had been wedged to prevent slipping and the rear wheels were jacked up on starting. When the engine was going at a good speed the car was pushed off the jacks and started out on high.

Knipper's Keeton, which was the last to finish, made thirteen stops, changing seven tires. Burman took the wheel of the Keeton after his car had been eliminated and drove for awhile, giving place to Knipper and again taking the driver's seat near the finish. Valve trouble occasioned a considerable loss of time near the end of the race. Knipper and Burman took it to be ignition trouble and put in a new coil, later finding a stuck valve was the trouble. The car had a very complicated spark control connection which ran from one side of the engine around the front to the magneto on the other side. Then some of these connections loosened up and this caused trouble for a time. "Mercedes Fritz," Knipper's mechanic, got after it with his Speednut wrench which he carried throughout the race and is very proud of the speed with which the repair was made. He also distinguished himself by slopping water all over the magneto when filling the radiator, causing a failure to start until the two distributors had been wiped out. Eliminations:

Car No.	Distance	Cause
7	Almost 330 miles.	Blew tire; skidded; broke frame.
34	Almost 360 miles.	Broke ball bearing in driving pinion.
1	Almost 340 miles.	Broke connecting rod.
19	Almost 320 miles.	Broke camshaft.
2	Almost 300 miles.	Blew tire and smashed wheel.
21	Almost 300 miles.	Broke magneto drive shaft.
15	Almost 220 miles.	Broke valve; thought it was connecting-rod.
38	Almost 180 miles.	Broke connecting-rods.
4	Almost 180 miles.	Valve through piston and crankcase.
13	Almost 180 miles.	Caved in piston head.
26	Almost 120 miles.	Turned over.
17	Almost 120 miles.	Broken connecting-rod.
24	Almost 120 miles.	Broken crankshaft.
49	Almost 120 miles.	Turned over.
12	Almost 80 miles.	Turned over.
48	Almost 10 miles.	Broken cam.

Foreign Lands Want American Small Car

Consular Reports from All Over the World Show Demand for Our Trucks and Cars

FOREIGN trade opportunities for American automobiles and their component parts this year have shown a tendency toward the small car, including the light motor trucks, cyclecars, etc. Our automobile products are giving the foreign market a stiff pull for trade and are gradually gaining in favor throughout the foreign countries. Ability to travel over the worst of roads, together with a low initial cost, has gradually created a demand for the small low-priced American car.

No. 12460. Light Cars and Cycle Cars—An American consular officer has forwarded the name of an automobile engineer who desires to secure the names of American manufacturers of light cars and cycle cars who may wish to establish general agencies in the United Kingdom. He states that he has been engaged in the cycle-car trade since the inception of the industry, and that he is in a position to deal with large quantities of these vehicles.

No. 12715. Motor Trucks—An American consular officer reports that a company in his district expects to purchase several automobile motor trucks of about 15 to 20 horsepower for transporting cases and boxes of petroleum, benzine, etc. American manufacturers are advised to submit prices, terms, catalogues, etc., to this firm as soon as possible. Definite information as to the specifications, number of vehicles, weight, etc., are not yet available, but these machines are to be ordered for various branch offices of the firm. It is thought they will be of about 3 to 3½ tons capacity and 15 to 20 horsepower. Correspondence may be in English.

No. 12781. Light Motor Trucks—A business firm has written the Bureau of Foreign and Domestic Commerce that it would like to represent an American manufacturer of light motor trucks having a capacity of 3 to 5 tons, for hauling mails, parcels and light merchandise. The firm desires catalogues, price lists, discounts, etc. The freight should be protected by a covered top and movable side screens. The country to be traversed is hilly, with fair roads which are narrow and winding with a fairly steep grade in places. Gasoline may be used, and there should be seat accommodations for two passengers besides the driver.

No. 12813. Tractors, Motor Cars—The Bureau of Foreign and Domestic Commerce has been advised by two foreign business men who are now in the United States that they would like to meet American manufacturers of tractors, motor cars. They state that they are familiar with American trade conditions and understand English thoroughly.

No. 12826. Cycle Cars—A South African sporting goods firm informs an American consulate that it is desirous of securing the South African agency for an American cycle car.

No. 12831. Cycle Cars and Small Automobiles—An automobile dealer in a European city informs an American consul that he would like to hear from American manufacturers who are ready to export cycle cars or small automobiles which retail at not more than \$450, as he believes they can be sold in that market. Correspondence may be in English and quotations, which may be in American money, should be for cars f. o. b. New York or c. i. f. Bremen and Hamburg.

No. 12850. Automobiles, etc.—An American consul reports that a business man in his district would like to secure agencies from American firms handling the following lines: Gasoline in cases and drums, freight and passenger automobiles and novelties of all kinds.

No. 12891. Motor Street Cars and Trailers—A European city is in the market for 35 new motor street cars and 40 trailer street cars. The type desired is the side-seated, inclosed platform style, and about \$270,000 will be expended for this rolling stock. An American consular officer writes that any American firms wishing to make tenders or learn the particulars of the proposed purchase of this new material should communicate with a person whose name he furnishes.

No. 12894. Electric Automobiles—A report from an American consular officer states that a resident of his district

has asked for the names of American manufacturers of small electric automobiles of 4-8 horsepower. The inquirer can correspond in English, and states that he will pay cash.

No. 12897. Automobiles—A company is being incorporated for the purpose of connecting two cities in the West Indies by a daily automobile service. An American consul states that the service is to be started within three months with one 12-passenger car. As soon as the service requires it another will be put on. It has not yet been decided what make of cars to purchase, but the management favors American machines and will be glad to hear from American manufacturers and to receive catalogues, etc.

No. 12920. Electric Vehicles—An American consul has forwarded a copy of a letter from a business firm in Scotland desirous of obtaining an agency for a good commercial electric vehicle of American manufacture for carrying 1 to 3 tons, the usual load being 1½ tons. The firm states that it has large machinery showrooms and does its own mechanical work; also has an extensive experience with electric motors, having been engaged in electric-power installations for the last 14 years. The firm would be willing to take the chassis and build the body and paint same over if necessary.

No. 13101. Small Motor Cars—A report from an American consular officer in the Far East states that he has received a request for price lists and discount sheets from American manufacturers of small motor cars. References will be furnished to interested firms.

No. 13017. Cycle Cars—A business firm in a European country informs an American consular officer that it desires to get in touch with American manufacturers of cycle cars. Correspondence should be in Portuguese or French.

No. 13022. Motor Car—A resident of a foreign country informs an American consular officer that he wishes to purchase an automobile suitable for traveling in the interior of a country, where roads are rough and sandy. He would like to receive catalogues and price lists of light American cars, or cars with high wooden (buggy) wheels, such as are manufactured in certain towns in Michigan and other Central States.

No. 13069. Medium-Priced American Automobiles—A European representative of a high-grade American-made automobile, who has recently made sales of a number of these cars, believes that he can carry an agency for the whole country of a small low-priced medium-powered American automobile of the two-seated runabout and small tonneau types, if the same can be laid down and still give him a reasonable profit when sold at \$1,400 to \$1,500. He informs an American consular officer that he would be pleased to hear from manufacturers of such machines, with catalogues, prices and details regarding the establishment of an agency. It is suggested that the cars should be shipped complete, with all equipment, with or without self-starter. Correspondence, in English, should be sent at once, with a view to launching properly a campaign for 1915 models.

No. 13091. Cycle Cars—A large foreign firm informs an American consular officer that it desires to get in touch with American manufacturers of cycle cars. One of its South African customers is considering the introduction of American cycle cars, and this inquiry is with a view to possible arrangements for an agency for the sale of such cars.

No. 13112. Automobiles and Cycle Cars—An American consular officer reports that a firm in his district desires to represent American manufacturers of automobiles (medium-priced and cheap cars, also cycle cars), agricultural machinery (tractors, steam or motor plows), etc. Correspondence in German.

No. 12921. Stationary Engines—A European commission agent informs an American consul that he desires to be placed in touch with American manufacturers of stationary engines of the semi-Diesel system from 5 horsepower up, using crude oil for fuel. He believes there is a good opportunity for the sale of such engines, if satisfactory terms can be arranged. Prices are desired c. i. f. city of destination, and correspondence may be in English.

NOTE—Where addresses are omitted they may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., and at the branch offices of the Bureau, 315 Customhouse, New York, N. Y.; 629 Federal Building, Chicago, Ill.; Association of Commerce Building, New Orleans, La., and 310 Customhouse, San Francisco, Cal. Apply for addresses in letter form, giving file numbers.

Factory Miscellany

FIRESTONE CO. AGAIN EXPANDING—In order to meet the rapidly increasing demand for its product, the Firestone Tire & Rubber Co., Akron, O., is again adding new additions to their plant. When H. S. Firestone put his final O. K. on the plans for the brand new building in 1910, it seemed that this plant was large enough to take care of the company's needs for years to come. The new building was completed and occupied in 1911. However, in 1912, it was necessary to again expand and new additions were added. 1913 found the company again cramped for room, and it again expanded. 1914 is but a repetition of the past, and the demand for Firestone tires makes it again necessary to add to its factory. One of its present wings 60 feet wide and 5 stories high will be extended on the north 125 feet. On the south one of the wings will be extended 125 feet, with the basement and the first floor covering a space 140 feet in width. This will give it approximately 95,000 square feet additional floor space. During 1913, three new boilers were installed, having a capacity of 900 horsepower each, making 2,700 horsepower in addition to its already large boiler capacity. These were ready for use by February 1914, and have been in continual use since that time. The company will install a new 4,000 kilowatt generator and steam turbine to furnish additional power needed for the extensions. Its present switchboard will be replaced by a new gallery board 70 feet in length.

Work Started on Ford Plant—The Ford Motor Co., is beginning work on its proposed assembling plant in Atlanta, Ga., estimated cost, \$300,000.

Keystone Co. Adds—The Keystone Carriage & Automobile Works, Erie, Pa., is taking bids for the erection of a brick, slow burning shop addition. Cost \$20,000.

Tomlinson Rim Co. Adds—G. E. Tom-

linson, Winchester, Ky., has awarded a contract for building a two-story addition, 96 by 122 ft., to his factory for the manufacture of rims for wagons, automobiles, etc.

Livingston Co. Finishes Plant—The Carbureter Mfg. Co., Livingston, Ill., has about finished its factory building, has a number of machines in place and is now ready for business. The equipment includes lathes, grinding machines, automatic screw machine, drilling machines, tool makers' forge, etc.

Overland Adds \$48,750 Building—Among important structures for which building permits have recently been taken out in Toledo is one for a \$48,750 factory building for the Willys-Overland Co., making the fourth permit issued to this concern this year, the entire four totaling an expenditure of \$1,000,000.

Xenia Rubber May Locate in Dayton—It is currently reported that the Xenia Rubber Mfg. Company, Xenia, O., recently incorporated with \$40,000 stock, intends to erect a factory at Dayton, O. The company manufactures mechanical rubber goods and expects later to make automobile tires. Roy Bickett, Xenia, is one of the principal incorporators.

Saginaw M. C. Co.'s Plant—The Saginaw Motor Car Co., Saginaw, Mich., recently incorporated with \$150,000 capital stock, has acquired a site of 5½ acres improved with a factory 200 by 400 ft., and expects shortly to commence the manufacture of automobiles. James P. Bowen, A. R. Thomas and W. L. Walls are at the head of the new enterprise.

Takes Over Lewis Spring's Plant—The Alloy Steel Spring Co., Jackson, Mich., has been incorporated with a capital stock of \$100,000 to take over the spring department of the Lewis Spring & Axle Co. The incorporators are: Fred J. Keiser, Caspar Harnle and A. L. Wuster. The new company will occupy a part of the Lewis Spring & Axle Co.'s plant for the present.

Allen Motor Co. Adds—The Allen Motor Co., Fostoria, O., contemplates the erection of a large addition to its plant on the site of the Atlas Mfg. Co., located just across the street from the present plant. Application has been made to the city officials for permission to build a covered passageway across the street and if that is granted the addition will be started at once. The company plans to build 2,000 cars next year.

Apple Not Handicapped by Fire—The machine shop of the Apple Electric Co., Dayton, O., burned on May 27, but this disaster will not upset deliveries in the least, says general manager F. A. Cornell. "The stock rooms, shipping and service facilities and the office, including records, are untouched," he says. "With our unlimited resources all deliveries will be practically non-interrupted. Additional floor space has been secured."

Mayor Visits Gray & Davis—The Mayor of Cambridge, Mass., accompanied by city officials and members of the Board of Trade visited the Gray & Davis factory on May 22 for the purpose of inspecting this model plant. These gentlemen spent an hour and a half going through the building and watching the production of starting-lighting systems. Not long ago, the Governor of the state made a similar inspection.

Goodyear Recommends Shaler Vulcanizers—Shaler vulcanizers have received an order from the Goodyear Tire & Rubber Co., Akron, O. This order consists of a requisition for a stock of Shaler Vulcanizers for every Goodyear branch in the United States. The Goodyear company decided that a car owner can obtain the best possible service from his tires only by taking care that the small cuts are sealed before sand, dirt and water are permitted to disintegrate the fabric. It has therefore issued instructions to each branch to see that as many Goodyear users as possible employ a Shaler Vulcanizer to prevent premature tire deterioration.

The Automobile Calendar

June 9.....	Cleveland, O., Annual Meeting Cleveland Engineering Society.	June 27.....	Brooklands Track, England; Annual Automobile Race.	Aug. 23.....	Auvergne, France, Coupe de l'Auto Race.
June 10.....	Isle of Man; Tourist Trophy Race; Royal Automobile Club of Great Britain and Ireland.	June 27-July 4....	A. A. Touring Week.	Aug. 27.....	Brooklands Track, England; Annual Automobile Race.
June 12-18.....	Chicago, Ill., Seventh Annual Reliability Run to Peoria and return; Chicago A. A. and Chicago A. C.	June 29-July 2....	Chicago to Boston National A. A. A. Reliability Tour.	Sept. 9.....	Corona, Cal., Road Race, Corona Auto Assn.
June 15.....	Savannah, Ga., Run, Savannah Auto Club.	June 30.....	London, Eng., Fourth International Rubber and Allied Industries Congress.	Sept. 26.....	Brooklands Track, England, Annual Automobile Race.
June 17-18.....	Fayette Co., Pa., Second Annual Hill Climb, National Pike.	July 2.....	Targo-Florio Cup Road Race, Madonic Circuit, Italy.	Sept. 26-Oct. 6....	Berlin, Germany, Automobile Show.
June 18.....	Uniontown, Pa., Hill Climb, Auto Club of Fayette Co.	July 3-4.....	Tacoma, Wash., Montamara Festo Races, Tacoma Speedway Assn.	Oct.....	Philadelphia, Pa., E. V. A. A. Annual Convention.
June 20.....	Milwaukee, Wis., Competition Run between Milwaukee Athletic Club and Milwaukee Automobile Club.	July 4.....	Prescott, Ariz., Road Race, Prescott Auto Club.	Oct. 9-Nov. 2....	S. A. E. Europe Trip.
June 23-26.....	S. A. E. Summer Meeting, Cape May, N. J., Cape May Hotel.	July 4.....	Sioux City, Iowa, 300-Mile Race, Sioux City Auto Club and Speedway Assn.	Oct. 16-26.....	Paris, France, Automobile Salon.
June 24-26.....	Chicago, Ill., Seventh Annual Meeting of Nat. Gas Engine Assn.	July 4.....	Lyons, France, French Grand Prix.	Oct. 17-24.....	Pittsburgh, Pa., Automobile Show, Auto Dealers Assn., Inc.
		July 13-14.....	Seattle, Wash., Track Races, Seattle Speedway Assn.	Oct. 19, 20, 21....	Philadelphia, Pa., Elec. Veh. Assn.'s Convention.
		July 25-26.....	Belgium Grand Prix Road Races.	Oct. 19-26.....	Atlanta, Ga., American Road Congress of the American Highway Assn. and the A. A. A.
		Aug. 21-22.....	Chicago, Ill., Elgin Road Races, Chicago Automobile Club.	Nov. 6-14.....	London, England; Olympia Show.

The Week in



the Industry

Motor Men in New Roles

ARNOLD Joins Standard Screw—E. E. Arnold has resigned as chief engineer and sales manager of the Houk Manufacturing Co., Buffalo, N. Y., in order to devote his entire time to the management of the Standard Screw Products Co., Detroit, Mich., in which he is heavily interested. The Standard Screw Products Co. will immediately enlarge its plant for the development of one or two specialties in connection with the automobile industry in addition to its present lines.

Werner President—The Swinehart Tire Sales Co., of Milwaukee, Wis., has been organized with R. M. Werner as president, and established a depot and offices at 139 Oneida street.

Frise Represents Tuthill Spring—W. A. Frise has accepted the representation of the Tuthill Spring Co., Chicago, for the State of Michigan, with headquarters in Detroit.

Wilcox Consulting Engineer—Howard Wilcox has acquired an interest in the Signal Motor Truck Co., Detroit, Mich., and will act in the capacity of consulting engineer and direct the sales.

Cox Joins Dodge Bros.—G. H. Cox, for years assistant sales manager of the Thomas B. Jeffery Co., and at present with the Willys Overland Co., has resigned to accept a position as district representative for Dodge Bros., Detroit, Mich.

Gilliard Resigns from Pullman—E. T. Gilliard, connected with the Pullman M. C. Co., York, Pa., for the last five years, as chief engineer, has resigned. Mr. Gilliard has several offers from various concerns, but is undecided as to which one he will accept.

Trotter Makes Change—J. E. Trotter, assistant manager of the Chicago branch of Buick Motor Co., has been appointed manager of the Indianapolis branch of the Buick company, taking the place of Ed. T. Strong, who becomes manager of the Chicago Buick branch.

Ames Appointed Receiver—Lee Ames has been appointed receiver for the Union Motor Sales Co., Dayton, O., upon the application of William L. Tobey. The appointment was made by Justice Markey. Lucien Soward is president of the company, which is said to be in financial difficulties.

Go to Lippard-Stewart—The Lippard-Stewart M. C. Co., Buffalo, N. Y., has added to its sale force C. A. Harmon, who has in the past been associated with The Rapid Motor Vehicle Co., the Cadillac M. C. Co., and the Packard M. C. Co., in similar capacities. Mr. Harmon will travel through the middle western territory. J. J. McDonough, Jr., Atlanta, Ga., is now district representative of the Lippard-Stewart M. C. Co., of Buffalo, in the southern territory. Mr. McDonough took up his work in this new connection the middle of May.

Titus Lands New Job—Fred J. Titus and George C. Lewis joined the sales staff of the C. T. Silver Co. during the

week. Titus is well known to New York motorists. He was for 7 years with Harry S. Hout and later was road representative for the Alco. Until he went with the Silver he was connected with the Simplex. Lewis for several years was sales manager for the Thomas and later was identified with the C. M. Gray Manufacturing Co., makers of bearings. Still another recruit to Silver's staff of salesmen is Ferdinand Cimotti, who dates back to the earliest motoring times in New York.

Pilkington Resident Engineer—R. G. Pilkington has been appointed resident engineer of the American Efficiency Survey of Motor Car Units, Chicago, Ill. Mr. Pilkington, together with the other members of the Board of Technical Detail—a number of whom are connected with the faculty of Purdue University—is now at LaFayette, Ind., where the tests of the American Efficiency Survey of Motor Car Units are being carried on at that organization's laboratories. These tests cover the working efficiency of each and every make of the various units entering into the construction of a motor car, and are of the most thorough and unusual type. A large amount of special apparatus designed by the members of this Board of Technical Detail is being prepared and installed in the laboratories—one of the most interesting pieces of which is a special late-type Diehl dynamometer. By use of this machine motors, carburetors, transmissions, axles, universals, etc., will be put through the most rigid examinations.

Garage and Dealers' Field

Heindl & Rothvoss Move—Heindl & Rothvoss, machinists making a specialty of automobile repairing, formerly of the Normal Garage, West 124th street and Seventh avenue, New York City, have moved to larger quarters at 211-215 West Nineteenth street.

N. Y. Mitchell Agent Makes Record—Henry Drouet, of Drouet & Page, local representatives of the Mitchell car, said that his company had distributed since March 1 no less than seventy cars at retail, a better retail record than even the Chicago house of the Mitchell-Lewis Motor Co. Thus far his second-hand dealer, Robert Lurie, has sold 50 used cars.

No Glaring Headlights in Columbus—Chief Carter of the police department of Columbus, O., has issued orders to have motorists discontinue the use of glaring headlights while driving within the city limits. An ordinance giving the department full power was passed last year, but so far the order was not as drastic. Chief Carter says he has not found any satisfactory manner in which to dim glaring headlights in spite of the devices on the market.

Want More Motor Buses—Apparently there are many capitalists in Queens who believe that transit development there will include the operation of motor bus lines. Last week the Board of Estimate granted a consent for the operation of

several motor bus lines in Jamaica and Flushing, N. Y. At the meeting to-day the board received a petition for a motor bus franchise to operate stages and omnibuses in the Rockaways. The petition was signed by the Rockaway Motor-Bus Line.

East Side A. C. A. Garage—Plans were filed for the Automobile Club of America's new east side garage, New York City, which will be erected on a plot fronting 125 feet on Seventy-first and Seventy-second streets, between First avenue and Avenue A. The plot begins 373 feet east of Avenue A and runs through the block to a depth of 204.4 feet. The land was leased on a long term from George H. Storm. William H. Gompert, the architect, places the cost at \$250,000.

N. Y. Battery Depot Moves—The New York service depot of the Philadelphia Storage Battery Co., Philadelphia, Pa., has yielded to the demands of a growing business and removed to larger quarters at 651-655 West Forty-third street, New York City, where it occupies the entire ground floor. The plant has been considerably enlarged with modern equipment and is devoted exclusively to the construction, repair, recharging and sale of storage batteries and supplies. The depot is operated by W. L. Thompson, the New York sales agent of the company, with offices at 1789 Broadway.

New Lee Tire Distributors—The Lee Tire & Rubber Co., Conshohocken, Pa., has added the following agencies: Lee Tire Sales Co., 457 Milwaukee street, Milwaukee, Wis.; A. J. Reynolds, 100 Lafayette street, Tampa, Fla.; Aber-Schultz Auto Supply Co., 105 West Fifth street, Austin, Tex.; Auto Accessories & Speedometer Co., 1558 Broadway, Denver, Col.; Lee Tire & Supply Co., 206 Ionia avenue, N. W., Grand Rapids, Mich.; Morgan Auto Co., 525 Sixth street, Sioux City, Iowa; Galveston M. C. Co., Galveston, Tex.; Northwestern Tire Co., 197 West Fifth street, St. Paul, Minn.; Goodby-Rankin Co., 57 Washington street, Providence, R. I.; New York Auto Tire & Supply Co., 20 Spring street, Rochester, N. Y., and the Bittel-Leftwich Tire Service Co., Fourth and Adams streets, Springfield, Ill.

Overland Representatives Assemble—The ninety-five representatives of the Willys-Overland Automobile Co. assembled in Toledo from all over the world last week at the annual convention held at the big plant on Central avenue. Every State in the Union from Maine to California was represented, and also such faraway countries as New Zealand, South Africa and China. The convention convened Tuesday morning and terminated May 29, when the travelers were carried to the Indianapolis speedway races in a special car. The days were given over to business sessions and the evenings to social diversions. Theater parties, a social entertainment at the Overland club house and a banquet at the Secor Hotel were among the big features. There were 200 guests at the banquet at the Secor, which was a unique affair.

Automobile Agencies Recently Established

PASSENGER CARS

Place	Car	Agent
Antigo, Wis.	Oakland	G. H. Maxwell
Auckland, N. Z.	Moon	Auckland Auto Co.
Aurora, Ind.	Oakland	C. O. Kemp & Son
Bathgate, N. D.	Maxwell	J. W. Scott
Campbell, Minn.	Maxwell	Weber & Wischhoffer
Chambersburg, Pa.	Maxwell	W. L. Forney
Chester, O.	Maxwell	D. R. Didenour
Chico, Tex.	Maxwell	H. C. T. Robinson
Council Bluffs, Ia.	Oakland	Skipton M. C. Co.
Dallastown, Pa.	Chevrolet	Ammon R. Smith
Dassel, Minn.	Maxwell	Dassel Motor Co.
Denton, Tex.	Maxwell	Holloway & Bishop
Detroit, Mich.	Haynes	F. H. Hill Co.
Dothan, Ala.	Maxwell	Tennille & Brown
El Paso, Tex.	Franklin	Lee Moor
Ensley, Ala.	Maxwell	Barrett & Knapp
Flat River, Mo.	Oakland	J. C. Parker
Friendship, N. Y.	Oakland	Middaugh & Thurston
Georgetown, Tex.	Oakland	Towns Bros.
Griffon, Ga.	Oakland	A. F. Gosset & Son
Hartford, Conn.	Haynes	N. E. Gar Co.
Hillsboro, O.	Oakland	R. D. Currie
Jacksonville, Fla.	Franklin	Winchester M. C. Co.
Lincoln, Neb.	Franklin	Ryan M. C. Co.
Los Angeles, Cal.	Lewis	E. Y. Boothe
Louisville, Ky.	Grant	Andrew Cowan & Co.
Louisville, Ky.	Kissel Kar	Thomas M. Carr
Marion, Ind.	Maxwell	Stoeke-Nelson Co.
Holbrook, Ariz.	Haynes	J. Jarvis & Sons
Mt. Carmel, Pa.	Franklin	P. H. Tye
Oklahoma City, Okla.	Briggs-Det.	T. F. Foster
Oklahoma City, Okla.	Maxwell	Herrick & Vandervoort
Portland, Ore.	Haynes	Nob Hill Gar. & Auto Co.
Quebec, Can.	Moon	Le Page Garage
Raton, N. M.	Haynes	E. J. Love Motor Co.
Rio de Janeiro, Brazil.	Moon	Du Ponge Auto Co.
San Francisco, Cal.	Fiat	A. G. Faulkner, D. W. Carlton, A. C. Bowles
Scranton, Pa.	Maxwell	Lackawanna Auto Co.
Seattle, Wash.	Oakland	W. P. Paugh
Sherman, O.	Oakland	Elmer Vossler
Silean Spgs., Ark.	Maxwell	Farmer & Perry
Soerabaya, Java.	Moon	T. B. Intveld
Spalding, Neb.	Maxwell	F. J. O'Hara
Stanford, Ky.	Maxwell	H. C. Carpenter
Starkweather, N. D.	Maxwell	Reeler & Fawcett
Springhill, La.	Maxwell	M. A. Stephens
St. Louis, Mo.	Hupmobile	Weber Implement Co.
Upoerco Md.	Maxwell	J. F. Armacost & Son
Viola, Ill.	Oakland	B. R. Nesbit
Washington, D. C.	Cartercar	Cartercar Sales Co.
Whittemore, Ia.	Oakland	Swanson & Son
Waynesboro, Pa.	Maxwell	J. C. F. Groh
York, Pa.	Jeffery	York Auto Exchange
York, Pa.	Maxwell	Snyder Auto Co.
York, Pa.	Republic	E. P. Beers
York, Pa.	Saxon	G. Ed. Swartz
York, Pa.	Vulcan	H. L. Bowers

COMMERCIAL VEHICLES

Aberdeen, Wash. Menominee. F. & F. Gar.
Albion, N. Y. Menominee. Albion Gar.
Anaheim, Cal. Menominee. P. E. Weisel & Co.
Arbuckle, Cal. Menominee. A. J. Atran
Astoria, Ore. Menominee. Earl Fisher

Place	Car	Agent
Batavia, N. Y.	Menominee	W. W. Buxton
Bellingham, Wash.	Menominee	Union Auto Co.
Bessemer, Mich.	Menominee	O. B. Olson
Binghamton, N. Y.	Menominee	Binghamton M. C. Co.
Binghamton, N. Y.	Stewart	F. H. Wilbur & Son
Bishop, Cal.	Menominee	Leece & Watterson
Boise, Idaho	Menominee	Adelmann Bros.
Brockport, N. Y.	Menominee	Wells Hdw. Co.
Buffalo, N. Y.	Menominee	L. G. Schoepfli Co.
Byron, Cal.	Menominee	Byron Gar.
Cambridge, Md.	Menominee	Cambridge Auto Co.
Chehalis, Wash.	Menominee	Twin City Auto Co.
Chicago, Ill.	Menominee	Menominee Mot. Sales Co.
Chico, Cal.	Menominee	W. H. Pillsbury
Cleveland, O.	Menominee	Colonial Sales & Ser. Co.
Cloverdale, Cal.	Menominee	G. F. Warren
Colusa, Cal.	Menominee	Messick & Crayton
Concord, Cal.	Menominee	Jos. Boyd
Corvallis, Ore.	Menominee	M. A. Rickard
Cuyahoga Falls, O.	Menominee	H. Schultz & Sons
Danville, Ill.	Menominee	R. Holmes & Bros.
Easton, Md.	Menominee	P. E. Corkran
Emporia, Pa.	Menominee	Emporia Mach. Co.
Erie, Pa.	Menominee	F. P. Fieger
Eugene, Ore.	Menominee	J. A. Wetzel
Eureka, Cal.	Menominee	R. H. Nutting
Everett, Wash.	Menominee	Knowles & Co.
Exeter, Cal.	Menominee	Schmidt Bros.
Fitchburg, Mass.	Koehler	Bascom & Littlehale
Fond du Lac, Wis.	Menominee	E. W. Clark M. Co.
Fort Bragg, Cal.	Menominee	Scott & Conway
Fortuna, Cal.	Menominee	Leach & Smith
Fort Wayne, Ind.	Menominee	B. S. Vail & Co.
Fresno, Cal.	Menominee	E. E. Bradley
Grants Pass, Ore.	Menominee	J. H. Williams
Hanford, Cal.	Menominee	Buckner & Schellabarger
Hartford, Conn.	Stewart	Universal Auto Co.
Healdsburg, Cal.	Menominee	N. A. Seipri
Honolulu, T. H.	Menominee	Von Hamm-Young Co.
Hibbing, Minn.	Menominee	Merchants Wareh'se Co.
Hilton, N. Y.	Menominee	L. I. Silliman
Houghton, Mich.	Menominee	Northern Gar. & Sup. Co.
Howman, Cal.	Menominee	Simon Newman Co.
Jamestown, N. Y.	Menominee	Slawson & Lansbury
Kankakee, Ill.	Menominee	G. A. Fortin
Kansas City, Mo.	Koehler	A. E. Lewis
King City, Cal.	Menominee	L. B. Ulrey
Knoxville, Tenn.	Koehler	S. Sedgwick & Sons
La Crosse, Wis.	Menominee	Eison & Phillips
LaFayette, Ind.	Menominee	G. S. Patterson
Lawrence, Mass.	Stewart	Knox Street Gar.
Leavenworth, Kans.	Menominee	Hesse M. C. Co.
Leedsdale, Pa.	Menominee	F. G. Mohn
Lexington, Ky.	Koehler	Union M. C. Co.
Lockport, N. Y.	Menominee	B. N. Lafler
Logansport, Ind.	Menominee	H. C. Metzger
Los Angeles, Cal.	Menominee	F. M. Sinasbaugh
Los Banos, Cal.	Menominee	Los Banos Gar.
Long Beach, Cal.	Menominee	F. A. McKenzie
Louisville, O.	Menominee	Louisville M. C. Co.
Lynchburg, Va.	Koehler	Bowles & Cotter
Macon, Ga.	Koehler	W. E. Cookerly
Madera, Calif.	Menominee	J. C. Walling
Madison, Wis.	Menominee	Frank Statz Gar.
Mansfield, O.	Menominee	J. W. Newlon
Marshfield, Oreg.	Menominee	G. Goodrum
Merced, Calif.	Menominee	Launsbury & Co.

Place	Car	Agent
Milwaukee, Wis.	Menominee	Auto Truck Ser. Co.
Minneapolis, Minn.	Menominee	Menominee M. T. Co.
Mishawaka, Ind.	Menominee	G. F. Eberhart
Modesto, Cal.	Menominee	Mires & Sacharias
Montague, Cal.	Menominee	Mt. Shasta Milling Co.
Napa, Cal.	Menominee	G. D. Reynolds
Nevada City, Cal.	Menominee	Alphad Hdw. & Sup. Co.
Newark, N. Y.	Koehler	Walter Schuman
New Tripoli, Pa.	Snyder & Winks	
Niagara Falls, N. Y.	Menominee	Peter Lammerts
Norwich, Conn.	Stewart	Shea & Burke
Norway, Mich.	Menominee	Norway Gar. Co.
Olean, N. Y.	Menominee	F. W. Forness, Jr.
Omaha, Neb.	Menominee	Lininger Imp. Co.
Olympia, Wash.	Menominee	J. B. Eshom
Ontario, Cal.	Menominee	C. L. Lampkin
Orland, Cal.	Menominee	Scribner & Allen
Oroville, Cal.	Menominee	Terrell & Francis
Oshkosh, Wis.	Menominee	F. S. Hoaglin Auto Co.
Pacific Grove, Cal.	Menominee	T. A. Work
Paskenta, Cal.	Menominee	Warmouth & Kerling
Peekskill, N. Y.	Menominee	Sorenson Co.
Petaluma, Cal.	Menominee	J. H. Madison
Philadelphia, Pa.	Menominee	Service M. C. Co.
Portland, Me.	Stewart	Portland Co.
Portland, Ore.	Menominee	Gerlinger M. C. Co.
Red Bank, N. J.	Koehler	Ed von Kattengell
Redding, Cal.	Menominee	Jno. Withers
Reno, Nev.	Menominee	Strinheimer Bros.
Rochester, N. Y.	Menominee	W. E. Davidson
Sacramento, Cal.	Menominee	Richards & Christie
Salem, Ore.	Menominee	B. G. Boedigheimer
Salisbury, Md.	Menominee	Peninsula Motor Co.
San Antonio, Tex.	Menominee	Fraser Auto Sup. Co.
San Francisco, Cal.	Menominee	C. N. Weaver Co.
San Jose, Calif.	Mogul	Pacific Mogul Co.
San Luis Obispo, Cal.	Menominee	San Jose Impl. Co.
San Rafael, Cal.	Menominee	Tognazzini & Righetti
Santa Cruz, Cal.	Menominee	Frank Riede
Santa Rosa, Cal.	Menominee	J. O. Cedar
Seattle, Wash.	Menominee	G. C. Schelling
Siusi City, Ia.	Stewart	John Kingquist
Spencerport, N. Y.	Menominee	Walter Havens
Spokane, Wash.	Menominee	Hawkins M. C. Co.
Stevens Pt., Wis.	Menominee	Gullikson-Holte Co.
Spartanburg, S. C.	Koehler	T. G. Ladshaw
St. Joseph, Mo.	Menominee	J. M. Nichols
St. Louis, Mo.	Menominee	American Weld. & Auto Repair Co.
St. Paul, Minn.	Menominee	Bergstedt Bros.
Stockton, Cal.	Menominee	Whyers Auto Co.
Superior, Wis.	Menominee	Ross M. C. Co.
Sturgeon Bay, Wis.	Menominee	Moeller's Gar.
Tacoma, Wash.	Menominee	Pacific Car Co.
Thurston, Ore.	Menominee	Rose Mathews
Tracy, Cal.	Menominee	Fabian Grunauer Co.
Trenton, N. J.	Stewart	The Motor Shop
Ukiah, Calif.	Menominee	Ukiah Gar.
Vacaville, Calif.	Menominee	Carl Crystal
Vallejo, Calif.	Menominee	Vallejo Car Wks.
Visalia, Calif.	Menominee	Coats Bros.
West Chester, Pa.	Menominee	Chester Co. Gar.
Willows, Calif.	Menominee	O. A. Klemmer
Wilmington, Del.	Menominee	Hansen Automobile Co.
Winona, Minn.	Menominee	Winona Motor Co.
Woodland, Calif.	Menominee	Electric Gar.
York Village, Me.	Koehler	R. S. Blaisdell

Recent Incorporations in the Automobile Field

AUTOMOBILES AND PARTS

BROOKLYN, N. Y.—Tomberg Auto Co.; capital, \$1,000; deal in automobiles. Incorporators: Christine Tomberg, W. P. Finn, Salim Barson.
CLEVELAND, O.—Commercial Truck Co.; capital, \$25,000. Incorporators: P. S. Crampton, F. B. Fults, G. W. House, C. R. Brown and Henriette Davis.
CLINTONVILLE, WIS.—South Side Machine and Auto Co.; capital, \$15,000. Incorporators: William Splittherburgh, Frank Ebert, Arthur Peotter and Levi C. Larson.
NEWARK, N. J.—C. Fitzgerald Motor Co.; capital, \$125,000. Incorporators: C. L. Fitzgerald, J. McAvoy, Elizabeth A. D. Rawson.
NEW YORK, N. Y.—Knapp Motor Corp.; capital, \$10,000. Incorporators: Hugh L. Hughes, Thomas G. Jenkins and Edward B. McKellar.
NEW YORK CITY—W. K. Hadley Co.; capital, \$500; deal in automobiles. Incorporators: W. K. Hadley, F. J. Pillsbury, H. E. Crowder.
SAGINAW, MICH.—Saginaw Motor Co.; capital, \$150,000. Incorporators: A. R. Thomas and W. L. Wells.
SPOKANE, WASH.—Automatic Current Motor Co.; capital, \$250,000. Incorporators: O. W. Watson, Edgar Watson and Clifford Rinear.
TORONTO, ONT.—Pneumatic Wheel Co.; capital, \$200,000; to manufacture automobiles. Incorporators: C. F. Ritchie, J. H. Oldham, W. J. Beaton and others.
WATERTOWN, N. Y.—Henderson Transportation Co.; capital, \$5,000; automobile business. Incorporators: R. W. Butterfield, L. D. Butterfield, Jos. Nellis.

GARAGES AND ACCESSORIES

ASBURY PARK, N. J.—Automobile Tire Cooling Co.; capital, \$125,000. Incorporators: Sexton Ball, Allan Lindsey, C. C. Leonard.
BATH BEACH, N. Y.—Bath Beach Auto Express Co.; capital, \$5,000; transfer, freight, express. Incorporators: M. M. and I. Goldsmith.

BIRMINGHAM, ALA.—United Auto Supply Co.; capital, \$10,000; to deal in automobile supplies. Incorporators: S. W. Wexler, N. Altmont and W. B. Stokes.
BLAIR, WIS.—Blair Auto Co.; capital, \$2,500; garage business. Incorporators: C. J. Gibson and eight others.
BRISTOW, OKLA.—America-Syrian Petroleum Co.; capital, \$25,000; general fuel business. Incorporators: Kalal Wasaf, J. G. Adamie, J. Abram.
BUFFALO, N. Y.—Bigger Rubber Co., Inc.; capital, \$10,000; to treat rubber by "Bigger process." Incorporators: A. Frank Bigger, Wm. J. Connors and Walter F. Hoechins.
BUFFALO, N. Y.—Vermont Garage; capital, \$1,500; general garage business. Incorporators: C. A. Volkert.
BUFFALO, N. Y.—Niagara Battery Corp.; capital, \$5,000; to manufacture storage and all kinds of electric batteries. Incorporators: Geo. H. Woodward, H. B. Parry and E. C. Schlenker.
CHICAGO, ILL.—Motor and Accessories Adjustment Co.; capital, \$10,000. Incorporators: S. R. Barr, Nathan Haffenberger and A. Layin.
CLEVELAND, O.—Euclid Penn Auto Supply Co.; capital, \$20,000; to deal in auto accessories. Incorporators: E. T. Cravlin, L. S. Buchanan, C. L. Smith, William Farver and V. P. Hendrick.
CLINTONVILLE, WIS.—South Side Machine & Auto Co.; capital, \$15,000; to operate machine shop, garage, etc. Incorporators: W. Splitterber, F. Ebert, A. Petter.
COLUMBUS, O.—Auto Combination Switch Lock Co.; capital, \$10,000; to deal in auto accessories. Incorporators: H. R. Elliott, C. E. Dennis, L. A. Van Anda, L. M. Van Anda, E. B. Dennis and Edward Dennis.
ESOPUS, N. Y.—Simpson Garage, Inc.; capital, \$1,500; garage, auto supplies, tires, rubber goods, etc. Incorporators: Herbert Gohen, Emil Adler and Jos. J. Curtin.
FREEPORT, N. Y.—Fober Rubber Co.; capital, \$10,000; to deal in tires, rubber goods, etc. Incorporators: Thomas P. C. Forbes, Jr., Geo. V. Slant and Anna S. Sloat.

GLOVERSVILLE, N. Y.—Auto-Comfort Robe Co., Inc.; capital, \$25,000; to manufacture auto robes, blankets, etc. Incorporators: Fannie G. Mil-dred, Luerne W. Rourk and Ulysses C. Patterson.
GLOVERSVILLE, N. Y.—Taxi Auto Livery Co., Inc.; capital, \$1,000. Incorporators: Thomas P. O'Hare, Daniel O'Hare and James F. O'Hare.
MILWAUKEE, WIS.—Milwaukee Garage Co.; capital, \$3,000; garage business. Incorporators: F. Toenhardt, Jr., E. H. Voight, Anna Voight.
NASHVILLE, TENN.—Federal Mfg. Co.; capital, \$100,000; to deal in automobile wheels. Incorporators: J. L. Dann, J. R. Tubb, B. B. Coffey and others.
NEW YORK, N. Y.—Fordham Garage Co.; capital, \$2,000. Incorporators: Vincent DeMeo, Albert DeMeo and Nathan Levy.
NEW YORK CITY—Ghezzi Veh. Fenders Co.; capital, \$10,000; automobile fenders. Incorporators: Domenico Ghezzi, F. Tauro.
NEW YORK, N. Y.—G. & J. Tire and Rubber Co., Inc.; capital, \$10,000. Incorporators: John W. Behus, Edward A. Jacobs and Sidney S. Levine.
NEW YORK, N. Y.—Portage Rubber Co., Inc.; capital, \$1,000; auto and bicycle tires, rubber goods, etc. Incorporators: E. P. White, W. W. Wildman, Jos. P. Curtin.
NEW YORK, N. Y.—Shirley Auto Fabric Co.; capital, \$10,000; to manufacture auto fabrics, etc. Incorporators: Edward J. Shirley, Arthur Shirley and Mary Shirley.
NEW YORK, N. Y.—Thiefproof Auto Lock Co.; capital, \$50,000; to manufacture, sell and install the "Thiefproof" Auto Lock. Incorporators: Frank Wallar, E. C. Hobcroft and M. J. Neuman.
NEW YORK, N. Y.—Twentyfirst Street Garage, Inc.; capital, \$26,000; general motor vehicle business and garage. Incorporators: J. Ginchurch, P. A. Lee and I. Dugan.
NEW YORK CITY—Lotos Garage Co.; capital, \$10,000; garage business. Incorporators: W. A. Larney, T. J. Tracy, Mabel Goudchaux.

Accessories for the Automobilist

MAXIM Ford Silencer—A muffler for Ford cars, Fig. 1, based on the same principle that has been so successfully applied to a silencer for the elimination of the report of a rifle has been invented by H. P. Maxim and is to be manufactured by the Maxim Silencer Co., Hartford, Conn. It is to sell for \$6.

When the gas enters the muffler it first issues into an expansion chamber, from which it passes through an orifice that is designed to give a suctioning effect into a series of chambers that give the gas a whirling motion. These chambers are formed by steel segments that have their ends separated and one end bent, as shown. As the gas passes through these chambers it first runs in one direction and then is abruptly reversed and sent in the opposite direction.

At the end of the first segment the gas, or more accurately the noise wave, is divided into halves, one part passing into the next chamber, where it is in turn divided into halves, and so on from one chamber to another until it is gradually dissipated.

The arrangement of the whirl chambers is such that any wave effect is made to take a circular and therefore endless path. This produces a rotary action of the wave in each of the chambers. The continuous rotation of the wave permits part of it to be discharged each time the crest passes an outlet opening. The effect of this endless circuit silences the wave effect that may occur, it is stated, and this, added to the silencing of the gas puff, gives an absolutely quiet exhaust.

The silencer is furnished complete with tail pipe and brackets and can be installed in a very few minutes.

Jaeger Rotary Valve Motor—The newest addition to the non-poppet ranks is the Jaeger rotary valve motor, a six-cylinder design, manufactured by the Jaeger Rotary Valve Motor Co., Inc., Mount Vernon, N. Y. The feature of this motor, Figs. 2, 3 and 4, is the use of a rotating sleeve that runs the length of the top of the motor. The sleeve is cooled on both sides and the intake and exhaust passages are contained in the core inside the sleeve.

Referring to Fig. 2, the operation of the motor will be clearly understood, the position of the valve for firing, intake and exhaust being definitely indicated. It will be noted that the intake and exhaust openings are obtained by slotted ports in the sleeves registering with similar ports in the core. The rotation of the sleeve is accomplished by helical gears attached to its middle.

As shown in Fig. 3, the intake pipe is connected to the passage at one end of the motor and the exhaust pipe at the other, while the spark plugs are placed in the combustion chamber at an angle.

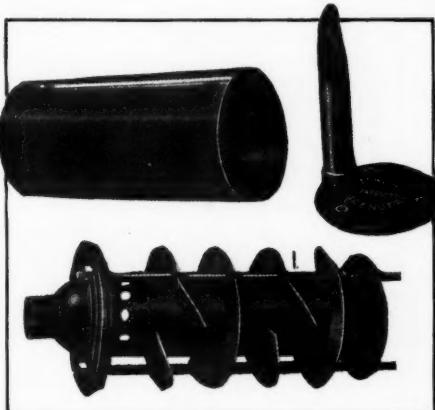


Fig. 1—Maxim Ford Silencer

The rotating sleeve has an outside diameter of 5.5 inches and is .3125 inch thick. There are large water spaces on both sides of it and it is lubricated through a positive oiling system. Although a clearance of less than two one-thousandths of an inch is used, rings are placed between each cylinder to insure perfect gas-tightness.

The advantages claimed for this motor are numerous. The fewer bends and obstructions there are in the intake manifold and the shorter the way from the carburetor to the combustion chamber the better the efficiency of the engine. In this motor the carburetor is directly connected to the intake end head and therefore the travel of the gases is very short. The intake channel divides in the middle and distributes to the right and the left, the cylinders further away having a larger valve opening. Looking at the combustion chamber, it can readily be seen that there are no side pockets that project beyond the bore of the cylinder and consequently there are no sharp edges and uncooled corners to hold glowing carbon, and furthermore the

area of the combustion chamber is reduced to a minimum.

Another feature of the motor is that the valve can be taken out in a very short time, it merely being necessary to remove the manifold ends and the long one-piece cylinder head that fits over the top of the sleeve.

Felco Ford Top—Ease of installation is the special feature claimed for a Ford top that can be attached to any runabout, transforming it into a coupé that not only protects one from the elements but makes driving in summer much pleasanter because it shields the occupants from the sun and dust and at the same time produces a strong circulation of air that blows over the passengers and keeps them cool.

The top fits flush with the body and a full-length door is furnished. It is manufactured by F. E. Lortz Co., 1332 Michigan avenue, Chicago, Ill., and sells for \$90.

Consumers Tires for Fords—A tire that is built exclusively for Ford cars has just been put upon the market by the Consumers Accessories Co., Indianapolis, Ind. It is made in only two sizes, 30 by 3 and 30 by 3.5 inches and it is said that the fabric and tread are 25 per cent. heavier than in the ordinary tire of this type. In fact it is called an over-size tire for this reason.

It is stated that by specializing on these two sizes that production cost will be minimized and that the tires will give a considerable saving to the Ford owner.

Home Valve Adjusting Lock Nuts—Proper adjustment between valve stems and push rods on Ford motors can very conveniently be obtained by the use of the Home valve adjusting lock nut, which is screwed on to the end of the valve stem and acts not only as an adjuster of the clearance, but also carries the spring. The device is made in two pieces, the

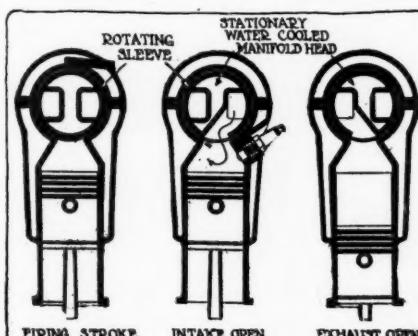


Fig. 2—Jaeger motor, showing positions of mechanism for firing, intake and exhaust

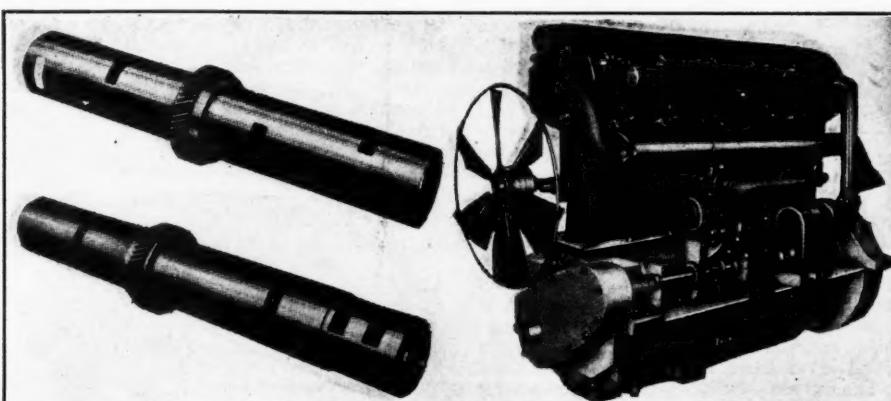


Fig. 3—Left—Jaeger motor. Note manifolds attached to the ends of the cylinder casting.
Fig. 4—Right—Sleeve with and without inner head

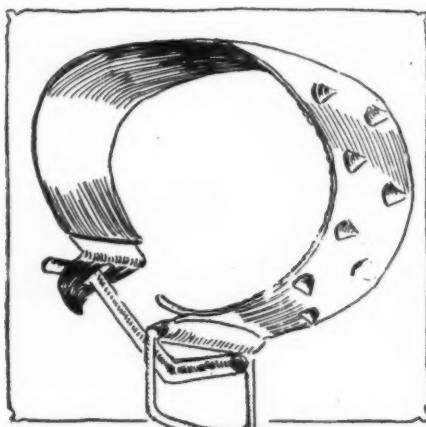


Fig. 5—Beeson non-skid tire band

upper one being the seat and the lower one the lock nut.

A set of eight sells for \$1.50 and eight new valve stems cost \$5. The maker is the Home Light Co., 2108 Dayton street, Chicago, Ill.

Beeson Non-Skid Tire Band—A new type of non-skid band, Fig. 5, has been brought out by the Beeson Non-Skid Tire Band Co., Ford, Ont. Four bands are used on each wheel and these are 2 inches wide and made of the very best spring steel, it is stated. They have raised lugs .25 inch high, to give a good grip. The lugs are case-hardened to reduce wear. These bands are lined with heavy canvas which prevents any damage to the tires or rim.

The ends of the band are made to hug the tire tightly when attached to it by means of a toggle buckle of special design.

One great advantage of this device is that when the car is stuck in the mud two or three may be attached to the part of the tire exposed, and then when the power is applied enough traction will be secured to move the car out.

Bicar Cyclocar Frame Channels—Steel frame members for cyclocar construction have recently been put upon the market by the Engineering Equipment Co., Indianapolis, Ind., in response to the demand for these parts. The stock side rails are 3 inches high by 1 3/4 inches wide and 115 inches long, and can, of course be cut shorter. Cross member stock comes in 105-inch lengths, 2 13/16 inches x 1 1/2 inches, or will be cut to any length desired.

Barnes Adjustable Arbor Press—An exceedingly convenient machine for pressing shafts into the hubs of pulleys, gear wheels, hubs, etc., and for straightening automobile shafts is made by the W. F. & John Barnes Co., Rockford, Ill. It has a capacity of 50 tons and is especially adapted for garage work.

Fig. 6 shows the construction and principle of operation. From the table rise two screw guides upon which the cross-head is adjustably supported, having two semi-screw nuts and a toggle mechanism by which the cross-head is held fast or released for vertical adjustment. The cross-head is balanced by weights, as shown, and a steady bar connects the press cup with the press screw. On this screw is fixed a spur-tooth ratchet wheel embraced by a forked lever head fulcrumed to oscillate on the press screw. A double-acting spring pawl engages the teeth of the ratchet and to the press screw a hand-crank is fixed.

The distances between screws is 20 inches, and between the head and table 36 inches, while the weight is 870 pounds. It sells for \$100.

F-F Shock Absorbers—A new shock absorber, Fig. 7, of the spring type, for Fords has just been put on the market by the France Mfg. Co., 1434 West 75th street, Cleveland, O., and it is stated that by its quick action all high-frequency vibrations are eliminated and the riding qualities of the car are greatly improved.

The essential feature is the long guide and vertical spindle which prevents side rocking and pitching. Direct action on the shock absorber spring is obtained by means of this long guide. The large diameter helical springs are made of chrome nickel vanadium steel, it is stated, and over 7 feet of stock are required to make one spring.

Heat treated drop forgings are used throughout and all parts are jiggled and machined to fit accurately in the place of the old spring perches.

Any one can easily attach them with such tools as are found in the average kit, as there are no holes to drill or any changes to make.

A set of four sells for \$15.

Powersteel Autolock—The Broderick & Bascom Rope Co., St. Louis, Mo., is marketing an automobile lock in the form of a cable 4 feet long, its ends being fastened by means of a padlock. It is made of yellow strand wire rope, which is claimed to be the strongest made, and which is also used on the Baseline Auto-line.

This rope is covered with a strong fabric which will last practically as long as steel, it is stated.

The Autolock, to lock the car, may be put through a wheel and around a spring in a few seconds, and the car can not be moved more than a few inches. It can also be used for chaining tires in place, etc. The price is \$2.

Bullock Motor-Generator for Small Cars—The Allis Chalmers Mfg. Co., Norwood, O., well-known manufacturer of steam engines, generators, large gas engines and the like, has recently brought out a small electric generator and starter for cars with less than 3 inches bore. It is cylindrical in shape, 5.625 inches in diameter by 11.75 inches long. The terminals are on the end and handholes are provided for ready access to the commutator and brushes.

A feature of the machine is that it has four poles, as it is uncommon for one of this size to have more than two. The commutator end of the machine is enclosed in an aluminum housing having four handholes, the four brushes and the commutator being accessible through these openings. These holes are tightly closed by a metal cover that clamps around the housing.

In order to eliminate the hum the armature is twisted the width of one armature section.

The standard Ward-Leonard output controller may be used with this instrument, the controller being connected into the shunt field circuit and regulates the output by varying the resistance of this circuit, variation in resistance causing a fluctuation in the field intensity which in turn changes the voltage and the voltage regulates the output.

The torque of the machine is great enough so that a 3 to 1 reduction may be used. At 2,000 revolutions per minute of the armature it will deliver 10 amperes at 6 volts.

R. M. Spark Plug—A new type of spark plug, which is claimed to have an unbreakable porcelain insulator, is announced by the Randall-Miller Co., Boston, Mass. The porcelain of this plug has a taper seat wound with asbestos and is pressed into a steel shell. The absence of gaskets and nuts for securing the porcelain is an added feature and the entire construction such that the plug does not leak, it is claimed. A ridge at the lower edge of the porcelain protects the asbestos packing and also al-

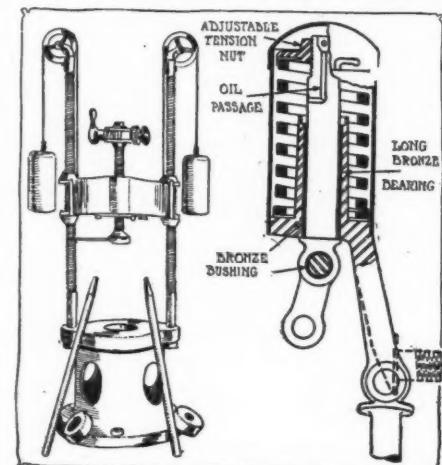


Fig. 6—Left—Barnes adjustable arbor Press
Fig. 7—Right—F-F shock absorbers

lows the parts to expand and contract with temperature changes. The R. M. plug sells for \$1.

New Twitchell Gauge—An improved Twitchell pressure gauge for tires is announced by the Twitchell Gauge Co., Chicago. This gauge in general appearance is the same as that marketed previously, but slight improvements have been made in its construction. The feature of the Twitchell is that it may be held at any angle and therefore can fit a wheel of small diameter. The lock-stop feature is retained. It sells for \$1.

Rusco Fan Belt—A fan belt for Ford automobiles that is distinguished because it is woven without a seam, is manufactured by the Russel Mfg. Co., Middletown, Conn., and it sells for 30 cents. It is uniform throughout and is guaranteed to give perfect service.

Detroit Demountable Rim for Fords—Demountable rims designed for Ford automobiles are manufactured by the Detroit Demountable Rim Co., Detroit Mich. Attachment is made easy by furnishing not only the rims but four complete wheels, minus hubs, painted and ready for installing in place of the present wheels. The equipment includes five rims.

The tire is removed from the rim by taking off one flange. The price of the complete outfit is \$22.50 and a special tire carrier sells for an additional \$2.50.

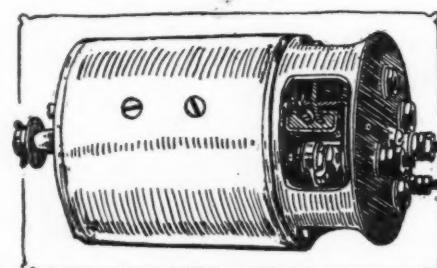


Fig. 8—Bullock motor-generator